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Editorial Comments.

THE PORT OF MANCHESTER AND ELLESMERE PORT.

The promotors of the Manchester Ship Canal, who did more for their city than possibly any small body of ardent enthusiasts have done for any city before or since, foresaw for the great waterway they schemed a line of development which is most surely coming about. The ship canal is generally envisaged as a deep-water cutting which enables ocean-going ships to penetrate between 30 and 40 miles inland, to a point which is universally regarded as an industrial centre unequalled in any other part of the kingdom, one may say the world. While this is essentially true, the waterway is something more; it is virtually a dock, over 35 miles long, capable of development along both banks for the greater part of its riparian mileage. It was so regarded by the far-seeing men who took such a bold step towards "adjusting" Manchester's destiny in the closing quarter of the last century. Their prophetic hopes are being realised to-day in a way which encourages the belief that one day their most optimistic dreams will come true in their entirety. The article on another page deals mainly with important developments in the lower reaches of the Ship Canal, where, since the war, the equipment for the handling of ships and cargo and the storage and transport of merchandise has spread for some miles along the south side of the Ship Canal creating what is virtually a new port, one which were it to stand alone, would stand high in order of importance, but which, is nevertheless an integral part of the Port of Manchester itself, as is anything which falls within the 35½ miles lying between the Manchester docks and the entrance to the canal at Eastham.

As regards the inland port of Manchester itself, not so much is known as ought to be known. It is a modern port whose origins go no further back than a few decades, yet one to which commercial history will frequently turn when it seeks to show what foresight and determination can do when it is stimulated by the urgent promptings of self-preservation. Manchester, as everyone knows, is the home of the textile industry, which is not only one of the country's oldest industries but one which has grown in time to be responsible for a great proportion of our export trade. This industry, centred in Manchester, looked abroad for every ounce of the raw material used on the cotton side, and its exports for the greater part went overseas. As foreign competition developed, competition to which Manchester itself contributed not a little for besides textiles goods at which it could not be beaten, it made textile manufacturing machinery which was unequalled also, the necessity for economy in every branch of the industry grew. Transportation is an important charge on every industry and its incidence upon one which was affected by both the carriage of the raw material and the finished product demanded the utmost consideration. To cut a long story short, Manchester's inland position was exploited and her apparent helplessness turned to the undue advantage of others. The screw was turned mercilessly and the city faced with industrial decline turned to its possibilities of making itself into a port as a means of working out its own salvation. In the face of great opposition it carried the scheme through, and, after a three years fight with Parliament and six strenuous years upon the actual work of construction, the canal was opened to traffic from end to end in 1894. To those who have devoted their time and energies to the development of the port fought both prejudice and established custom for so many years of a lifetime, its rise to a leading position may not have seemed rapid, but there can be little doubt that time, the final arbiter in such matters, will point to it as something of a prodigy and will have a good deal to say not only about its romantic origins but about the rapidity with which it grew, in something over 30 years, to become bracketed with Hull for third place amongst British ports. To-day its annual trade is valued at about £100,000,000, and only the fringe of its possibilities have been touched.

An adverse influence in the development of the port has been a tendency to part load at Manchester, the cargo being completed at another port. The development at Ellesmere Port, is the Ship Canal Company's very complete reply to this, and forms the subject of this month's Supplement.

FINANCING DOCK FACILITIES.

Some interesting figures of capital invested in the great docks of the United Kingdom are given by the Port of Bristol Authority in "Facts and Figures relating to the Port," which, besides affording some idea of the scope of their own activities, shows the extent of the financial outlay made by other leading dock authorities in their work of maintaining shelter and service for maritime trade. The scope of these burdens will be more widely realised when the rebates in industrial rating provided by the last Budget are computed.

Five of the principal dock systems represent an aggregate capital of nearly 105 million pounds, Liverpool Docks accounting for 40.5 millions; London, 35 millions; Manchester, 19 millions; Glasgow, 11.1 millions and Bristol 8.2 millions. The railways also figure prominently among the large dock owners.

The London and North Eastern Railway, with its facilities at Hull, Grimsby, the Hartlepools, Tyne Docks, Lowestoft, Immingham, King's Dock, Middlesbrough, Methil, Harwich and Burntisland has docks representing a capital expenditure of 22.4 millions.

Capital invested in the docks of the Great Western Railway at Cardiff, Swansea, Newport, Barry, Port Talbot, Penarth and Plymouth amounts to 17.9 millions, and in those of the Southern Railway, 7.2 millions chiefly represented by the extensive facilities at Southampton.

When the Colwyn scheme consolidated the railways of the country into a few autonomous groups, a number of individual docks and harbours were merged into those of the railways. The unified working of certain groups of docks has resulted in a considerable measure of success despite the handicap of reduced traffic in certain goods, notably coal. This applies especially to the South Wales ports, where new plant has actually been laid down. Warehouse accommodation has been increased and the machinery of management re-cast. Heavy expenditure has been necessary but the improved methods have proved more economical. Some of the less modern docks are likely to pass out of commission, but the total handling capacity of the ports will not be reduced.

At Southampton the Southern Railway has been steadily pressing forward extensions involving several millions sterling whilst in turn the L.M.S. has been engaged on the problem of expanding the volume of goods passing through its ports and is increasing accommodation more especially at Wyre Dock, Fleetwood. The heavy burdens borne by the London and North Eastern Railway in connection with the Immingham Docks illustrates the obstacle to long-sighted construction presented when trade is slow of expansion.

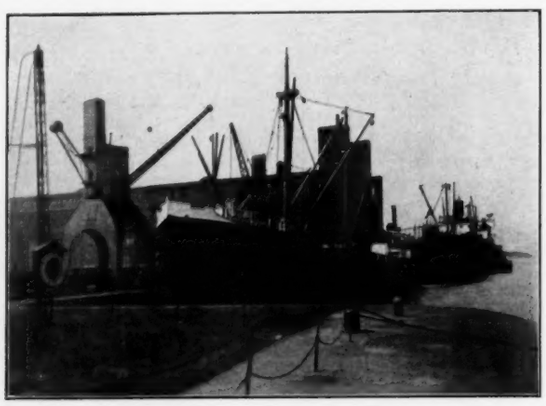
In the past dock undertakings administered by the L.N.E.R. have been entirely responsible for the development of leading ports on the North East Coast—involving extensive dock works constructed and extended over a long period of years. A proposal was made earlier in the year for the construction of a south-west arm to the King George Dock at Hull. This would have cost half a million and was rejected by the authority on the ground that the income which might be expected from it did not justify the expenditure.

Recent financial expenditure has not been limited to railway dock undertakings, and during the last few years outstanding examples of programmes embarked upon and completed by public authorities include the new Gladstone Docks, Liverpool, costing £7,500,000, and opened in July, 1927; Eastern Arm Extension, Royal Edward Dock, Avonmouth, £1,325,000, June, 1928; the recently-opened river entrance lock at Birkenhead, the new riverside quay at Albert Edward Dock, Newcastle, whilst a number of works are in hand at the docks of the Port of London Authority, notably at Tilbury.

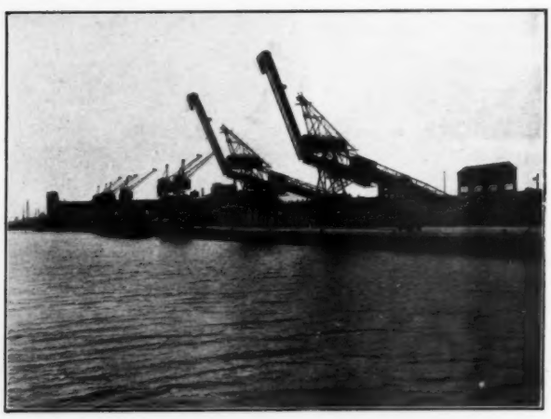
The Manchester Ship Canal and Ellesmere Port.

The recently-constructed Transit Sheds on the North side of No. 9 Dock, Manchester.

A nearer view of a ship about to load coal at the New Conveyors. It will be noticed how the Conveyors pass over the top of the Transit Sheds.



Ships alongside the Grain Warehouse.



The work on the Wharf Extensions virtually completed.

A Dockside view at Manchester Docks, showing the Quay arrangement of Cranes and the Rail connection. Every Ship's Berth at Manchester has the Railway alongside.

New Quayside Cranes on Ellesmere Port Wharf. These are 6-ton Gantry Cranes and they are here engaged discharging iron ore.

The Manchester Ship Canal and Ellesmere Port.

Recent Developments Undertaken.

THIS Canal is an integral part of the Port of Manchester which at present ranks fourth among the ports of the United Kingdom by virtue of the annual value of its imports and exports. The Port Authority is the Manchester Ship Canal Company, which was incorporated by the Manchester Ship Canal Act, 1885. The authorised capital of the Company at December 31st, 1927, was £21,573,230: the expenditure on Capital Account at the same date being £19,675,290. The latter figure includes the price of the Bridgewater Canals which were taken over by the Manchester Ship Canal Company under the Act of 1885, under which the Ship Canal was constructed. Particulars of the authorised and issued capital are as follows:—

	Authorised.	Issued.
Ordinary Shares £1 each	£4,000,000	£4,000,000
Perpetual 5 per cent. Preference Shares £1 each	4,000,000	4,000,000
Manchester Ship Canal Corporation 3½ per cent. Pref. Stock ...	1,061,230	1,061,230
First Mortgage Debentures	1,812,000	1,807,000
Second Mortgage Debentures ...	600,000	600,000
Debenture Stock and Bonds under Act of 1904	2,000,000	1,970,155
New Mortgage Debentures (held by the Corporation of Manchester)	5,000,000	5,000,000
Mortgage of Surplus Lands ...	100,000	50,000
Mortgage Debentures or Debenture Stock and bonds under Act of 1913	1,000,000	909,565
Ditto under Act of 1925	2,000,000	—
	£21,573,230	£19,487,950

The construction of the Canal was begun in November, 1887, under the superintendence as engineer of Mr. (afterwards Sir) E. Leader Williams, Mr. T. A. Walker being the contractor until his death in November, 1889, when other contracts were arranged. The work of construction occupied a little over six years, the Canal being opened for traffic on January 1st, 1894, and officially opened by Queen Victoria on May 21st, 1894. Many important developments have taken place since that date, including the construction of No. 9 Dock, Manchester, which was opened on July 15th, 1905, by King Edward VII. and Queen Alexandra. In 1922 a new Dock was constructed at Stanlow near Ellesmere Port for the discharge and loading of petroleum spirit cargoes and important facilities have recently been provided at Ellesmere Port itself for coal bunkering by the most modern methods and for the expeditious handling of grain and general cargoes. The Canal itself, which, as originally constructed, had a water depth of 26-ft. throughout has been deepened to 28-ft. from Manchester to Stanlow and to 30-ft. from Stanlow to the entrance at Eastham on the Estuary of the Mersey.

The waterway is 35½ miles in length extending from Eastham, where there are entrance locks respectively 600-ft. long and 80-ft. wide and 350-ft. long and 50-ft. wide, to Woden Street Footbridge about 1½ miles from the centre of the City of Manchester.

Looking up No. 9 Dock, Manchester. No. 2 Grain Elevator is at the head of the Dock, a range of New Transit Sheds are on the North side and, to the right of the Southern Transit Sheds, is New Barns Railway Siding; on the left, Timber Storage Grounds.

The water level in the Canal is raised from the level in the Estuary section (which is semi-tidal) by means of four sets of locks, at Latchford (south-east of Warrington), Irlam, Barton, and at Mode Wheel, near Manchester. At each point the locks are built in pairs with intermediate gates to avoid waste of water in the passage of vessels of various tonnage.

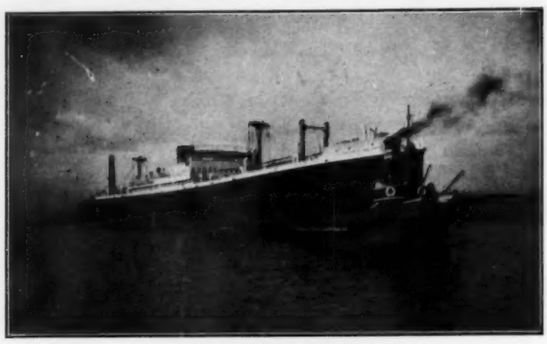
The greatest rise is at Irlam Locks, where the difference between the lower and upper water levels is 16-ft., and the smallest rise is at Mode Wheel Locks, where the difference of water levels is 13-ft. Subsidiary locks forming side entrances to the Canal from the River Mersey are situated at Weston, Runcorn and Warrington.

The principal sources of the water supply to the Canal are the Rivers Irwell and Mersey, the former of which feeds the Canal at Manchester, the Canal following substantially the old line of the river from Manchester to Rixton, a distance of 12 miles. The upper waters of the Mersey enter the Canal on the south side at Irlam and form part of it for some 4 miles to Rixton, where the Mersey leaves the Canal on the north side and assumes an independent course to the sea. The lower section of the Canal from Runcorn to Eastham forms a curved line of some 13 miles along the Cheshire shore of the Mersey Estuary from which, for a large part of the distance, it is separated by strongly constructed walls and embankments.

The Manchester Ship Canal was constructed with a general bottom width of 120-ft. It is regularly navigated by large vessels of a dead weight carrying capacity of 15,000 tons, and there are regular steamship services between the Port of Manchester and the principal ports in most parts of the world.

At present the principal part of the Dock system is at the Manchester end, where the Dock Estate covers an area of 406½ acres, including eight docks with a water space of 120 acres and quays approximately six miles in length. The latter are excellently equipped with electric and other cranes and with all up-to-date appliances for handling cargo with despatch. Multiple floor "transit sheds," designed to resist fire, are provided near the waterside for the accommodation of goods

in transit. They include a Cold Chamber for the sorting of frozen meat and other perishable produce. Two new five-floor "Transit Sheds" of reinforced concrete fully equipped with mechanical appliances and with special facilities of access by rail and road have recently been completed at No. 9 Dock at a cost approaching half a million sterling.



The "Pacific Reliance," one of the new Furness Withy ships on the Manchester-Pacific Coast run.

All berths are directly connected by rail with the dock railway system and with the main line railways of the country and goods may be discharged from ship either to railway wagon or road vehicle alongside or into transit shed with a minimum of handling. For the reception and storage of grain in bulk there are two grain elevators with a total capacity of 80,000 tons, into which seven vessels may discharge grain simultaneously by means of conveyor bands electrically driven in subways beneath the quays. There is also general warehouse accommodation on an extensive scale for free and bonded goods and large open storage grounds for timber.

At Barton-upon-Irwell the Ship Canal is crossed at right angles by the Bridgewater (barge) Canal, originally constructed in 1760. The latter is carried over the Ship Canal by a swing aqueduct which is built as a caisson or trough filled with water turning on a central pivot. The swing aqueduct moves on a ring of 64 rollers; the clear opening is 90-ft.; full length 235-ft.; width 18-ft.; depth of water 6-ft.; weight when swinging 1,400 tons.

At Partington, eight miles from Manchester, is a large coaling basin for loading vessels with 5½ acres of water space and 6 tips. It has direct rail connection with the Lancashire Coalfields, the nearest of which is only eight miles distant, and with the South Yorkshire and Staffordshire Coalfields.

At Runcorn the Bridgewater Canals system joins the Ship Canal and there is an extensive system of docks covering 70 acres available for coasting vessels and barges, with quay and storage space covering 77 acres. These docks are connected by the canal with the Staffordshire Potteries and coal and iron industries. At Weston Point is the junction with the River Weaver Navigation.

Ellesmere Port and district is the centre of some rapid developments due to the Ship Canal. The traffic in petroleum spirit at Stanlow Oil Dock has within a period of six years already brought Stanlow into a position which in this respect is second only to London. Ellesmere Port itself is the outlet for the system of Shropshire Union Canals. The docks which adjoin the Ship Canal are leased and worked by the Manchester Ship Canal Company. The extensive quay frontage to the Ship Canal has recently been greatly developed by the construction of a new wharf and coal conveyors and transit sheds for general cargo, and by the modernisation of the accommodation and handling facilities for grain cargoes. The Canal at this point has a depth of 30-ft. and vessels outward bound from Manchester may complete their loading or bunkering at Ellesmere Port—now likely to become one of the principal centres within the Port of Manchester.

The Port of Manchester, as a whole, is remarkable for its extensive deep-water frontage with much land along the length of the Ship Canal available for the erection of factories and works for which ready water transport and railway connections are advantages. Already upwards of 200 industrial establishments have been erected in the vicinity of the Port, representing a capital outlay estimated at well over £35,000,000. The railways of the Manchester Ship Canal Company serving the Ship Canal and connecting the various docks and works thereon with the main line railways include over 200 miles of railway track.

The Port, situated within the most populous industrial district in the country, serves an area containing over 180 important towns, more than half of which have a population of over 10,000. The total population of this area is about 10,000,000.

The Head Offices of the Manchester Ship Canal Company are at Ship Canal House, King Street, Manchester. The principal Dock Offices are at the Manchester Docks, Trafford Road, Manchester.

ELLESMERE PORT.

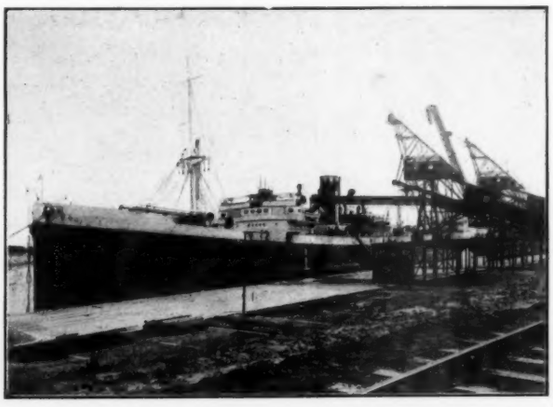
Places, like people, have a way of emerging with some suddenness, although the qualities which bring them abruptly into the public eye may have been a long time in the making. In the autumn of 1843 Ellesmere Port made a bid for national attention by opening a "magnificent new dock"—a little basin 435-ft. long and 139-ft. wide, which cost about £100,000. It was opened with a flourish of trumpets whose reverberations echoed in the London Press. It displaced a public-house and a few cottages, and laid the foundations of a port which has already developed into considerable importance, but with which destiny is by no means finished.

Before the coming of the Ship Canal, which took Ellesmere Port into its arms, as it were, and embraced it in the great system which extends for over 35 miles, from Eastham to Manchester, the port had attracted a good coastal trade and had even received a cargo from the Rio Grande, upon what would now seem to us lilliput quays; the romantic river that runs down golden sand provided the "Albion" with a prosaic cargo of just under 500 tons of bone ash. Grain from Ireland, china clay from Cornwall, slates from Wales, passed through the locks and arched warehouses of the little port.

You will need to project your mind back to an age of smaller things to appreciate the stir made by the opening of the new dock. The cannonading, the flowers and the feasting, the boiled beef, plum pudding, cheese, and a pint of ale apiece for a staff of 480, signalised an important piece of transport development well understood by a hinterland which relied upon inland water-transport in a way scarcely realised to-day. With the enlargement of the port came such "novel and remarkable features" as steam tugs to ply on the canals and a remodelled system of canal carriage; luggage trains to be run with the same regularity as post office and railway conveyance, at a speed of eight or ten miles an hour, and a regular system of passenger traffic "so economical as to be, perhaps, the lowest yet devised." Unfortunately for these aspirations, railway trains were soon to run with a regularity and speed not then dreamt of, and the grandchildren of the feasters of that day were eventually to look askance at the advantages of the railway train itself.

Before the Ship Canal ran across its threshold and provided it with a new front door to the Mersey and a vestibule with 30-ft. of water and quays and equipment designed for the largest ocean-going freighters, the port had, in the matter of direct seaborne and coastal traffic, virtually reached saturation point, and this trade had ceased to develop through lack of accommodation.

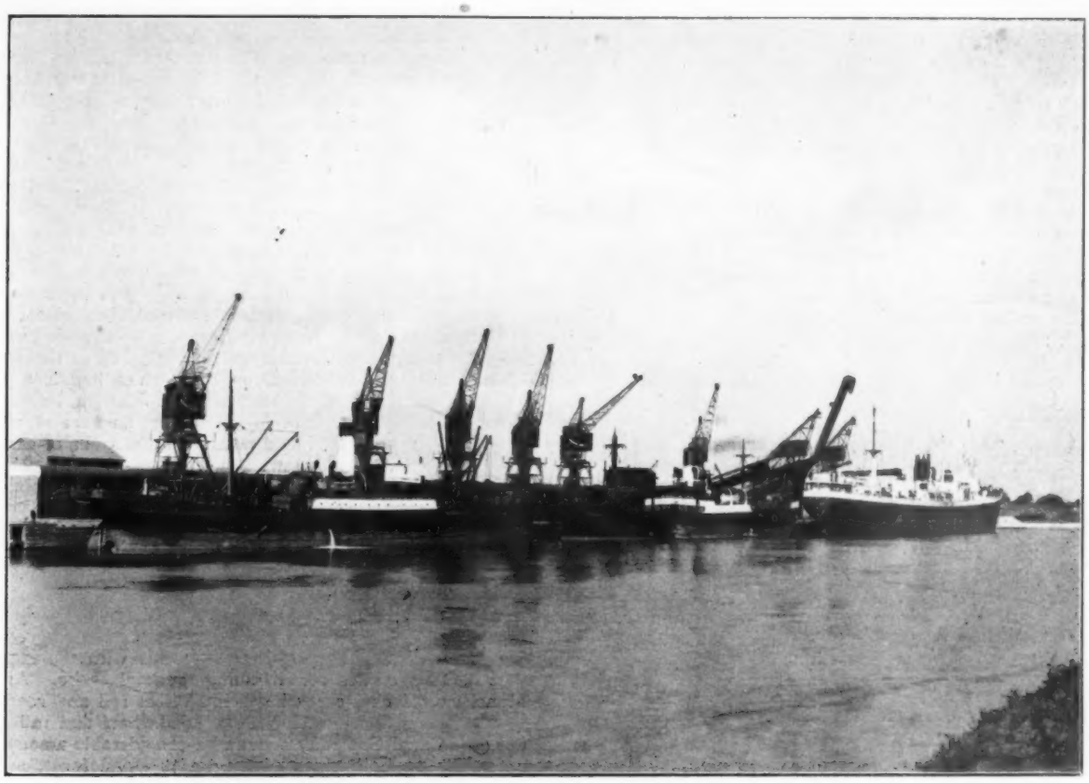
In 1884 some 335,000 tons of traffic passed in and out of the port, of which some 107,000 tons was barge traffic from and to other Mersey ports, and the rest was carried in seagoing coasting vessels. Many of these coasting vessels had to be discharged in the tideway, as their size had outgrown the entrance lock. We have then, before Manchester decided to run a great waterway past its front door, a little place with a population of less than 2,000 souls and a rateable value of about £8,000, situated at the end of a system of canals extending into the heart of England and Wales, and engaged in passing out the products of Wales and the English Midlands and passing inwards in return such of the requirements of these districts as the coastal trade and occasional overseas cargoes offered and, of course, a good deal of transhipped cargo from other Mersey ports—foreign grain barged from Liverpool amounted to as much as 100,000 tons yearly.



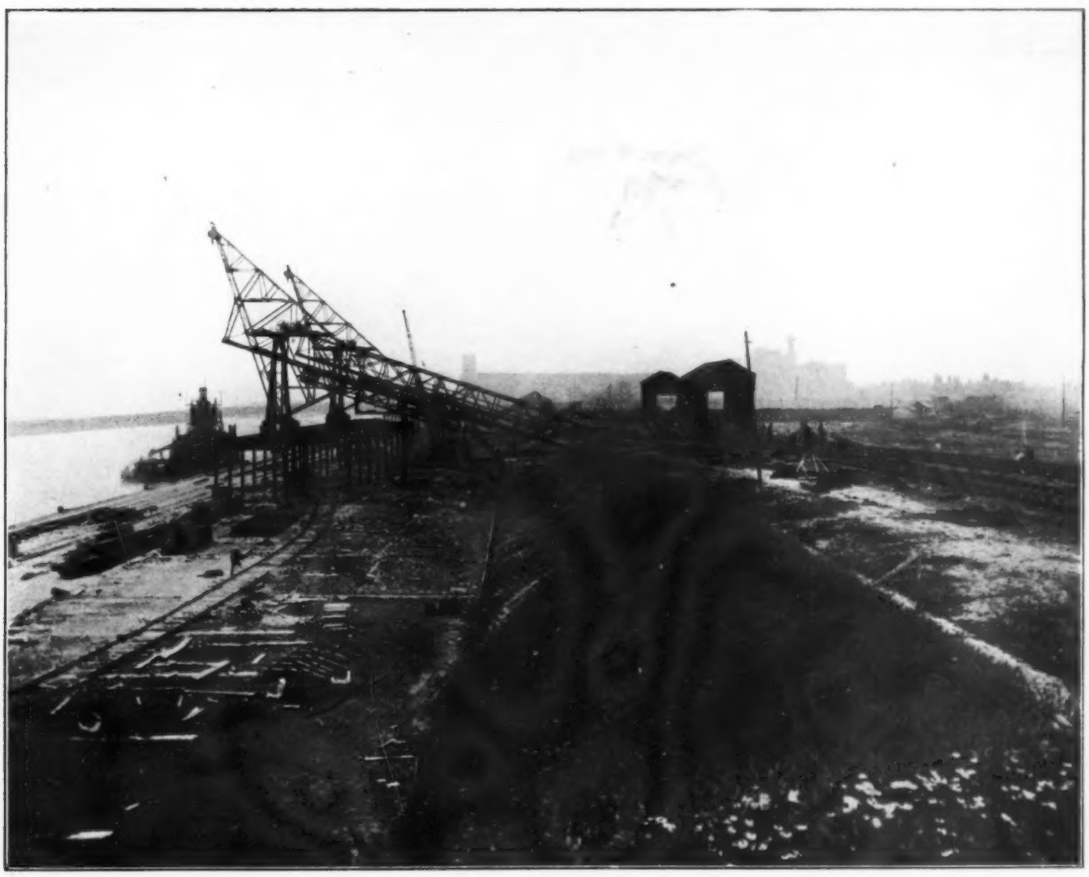
Ship bunkering at Ellesmere Port.

After sounding that shrill note of self-assertion in 1843 Ellesmere Port had settled down to work, as we have seen, but events were marching onwards at a rate with which it could not keep pace, and it looked like sharing the fate of Rye or Winchelsea, when it suddenly found itself encompassed by the port of Manchester and rising again, if not from its ashes, at any rate from its embers, to take part in a development which is setting the stage for a second emergence destined to place it amongst the important ports of the country.

Ellesmere Port Wharf Extension.



View of the Western end of Ellesmere Port Wharf, showing the New Cranes and, beyond, the New Coal Conveyors. Ships are alongside and the Ship on the right is taking in bunkers at the new plant.



Ellesmere Port Wharf Extension, showing the framing for the New Transit Sheds and the beginning of work on the New Coal Conveyors.

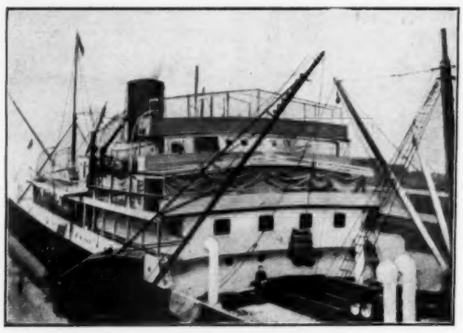
From the opening of the Ship Canal until 1922 the port was independent, a realm within a realm, in the port of Manchester but not of it; but its modern development had begun. In these days when new highways are being pushed in every direction we are familiar with the little house which, once buried amid a shrubbery and out of the bustle of affairs, suddenly finds itself flanking a main road. Its aloofness lost, it quickly undergoes a change. It is rebuilt or provided with a shop front, and it settles down to make the most of its changed circumstances. That is what has happened at Ellesmere Port. On the 16th of July, 1891, traffic to Ellesmere Port by way of the Ship Canal commenced, and from that day onwards the record of progress and development has been sustained.

It was a very changed port which re-opened for traffic in the summer of 1891. Instead of a system of locked basins accommodating ships averaging some 250 tons burthen, which entered on precarious tides from the shallow bay formed by Stanlow Point and the spit now known as Mount Manisty, we have a port with a deep water frontage accessible for 16 hours in the day to ocean freighters.

Notwithstanding the great gifts brought by the Ship Canal, it was oil, after all, that assured the revival of Ellesmere Port, as it brought about the revival of the wayside inn and the transformation of the little house in the shrubbery.

AN OIL PORT.

Stanlow, at the eastern extremity of Ellesmere Port, is a familiar name in the oil world. Here, in 1922, the Ship Canal Company opened an oil dock on the north side of the canal, and on the opposite bank already close upon 200 acres are covered with the installations of some of the largest oil companies. The Anglo-American, British Petroleum, Shell Mex, British Mexican, and Redline Companies have covered the landscape with their circular tanks, and the Canal Company



The Holmes Control Gear. There is no man in the crane. The operator on the hatch-combing is controlling the movements of the crane and watching the load at the same time—a method which economises labour, lessens risk and saves time.

has patterned the district with a network of railways and roads for their convenience. In the specially constructed dock on the north bank, ships lie snugly closed in with the safety floating boom while their cargo is passed through pipes running in a subway beneath the canal to the storage tanks on the other side. Loading and discharging are both carried on in the dock and there are special pipe lines for spirit, petroleum and gas oils, and a steam-heated line for crude and fuel oils. You will find a tanker discharging petroleum spirit loaded up near the Golden Horn or in the Caribbean Sea at some open roadstead which calls for the unusually heavy anchors housed at her bows; and at the other side of the dock a specially-constructed coaster picking up a cargo of spirit or fuel oil for some coastal port.

It is at Stanlow that the dangerous, the low flash-point, spirit is dealt with, and intensive development of this traffic is going forward. There are, too, the by-products of distillation; road-dressing is one, and at the 600-ft. lay-bye on the south side of the canal, cargoes are loaded up for highways as near as Ireland or as distant as Araby. The drums rolling down to the ship on gravity runways are made a mile or so away—thus does one development beget another. The developments at Stanlow have easily placed Manchester in the position of the second oil port in the country, and if the progress of the last five years at Stanlow is maintained Stanlow may shortly occupy this position alone. The Ship Canal Company have a large area of land available for oil sites and other industrial purposes, the utilisation of which is plainly not far distant.

PORT FACILITIES.

It was, no doubt, the oil developments at Stanlow that attracted the attention of the Ship Canal Company to the possibilities of Ellesmere Port itself. A map of England will show at a glance that Ellesmere Port occupies one of the most strategical positions in the line of communications with the industrial areas of the Midlands and the North of England. If you examine in more detail a railway map or a road map or a canal map you will find your first impression amply confirmed.

The port is directly connected with the London, Midland and Scottish and Great Western Railways and through them with the principal railway systems of the country. It is as near by railway as Manchester itself and considerably nearer than Liverpool and Birkenhead to the industrial area of the North of England. By road it is only seven miles from Chester, one of the nodal points of the road system of the country, and the road communication is excellent.

Not only has Ellesmere Port the advantage of deep water communication with the world at large by the Ship Canal, but it is also linked up with the main inland navigations of the country. The Shropshire Union Canal joins the Ship Canal at Ellesmere Port and with its collateral branches affords inland water communication with the heart of Wales, the Black Country and the Potteries. The Bridgewater Canal system is connected with the Ship Canal at Runcorn, and with its tributary systems affords convenient access to the industrial area of the North of England. Whenever the project of a 100-ton barge canal to connect Birmingham with the sea comes to realisation the claims of Ellesmere Port as the outlet by way of the Shropshire Union route cannot be overlooked.

With an eye to all these circumstances the Ship Canal Company, in 1922, took over the dock undertaking of the Shropshire Union Railways and Canal Company, which had then just been absorbed in the London Midland and Scottish Railway Company. The dock undertaking then had an area of about 210 acres of land and water and possessed a number of canal warehouses and a coal tip, as well as a large grain warehouse with deep water frontage on the Ship Canal, and adjoining three important flour mills which had been established on the dock estate. There had also been established a timber and creosoting works.

The Canal Company have since extended the deep water wharf, which is now nearly half a mile long, with berths in the Ship Canal dredged to a depth of 30-ft. They have installed the most modern coal conveying plant for shipping coal cargo and bunkers, and spacious transit sheds with the most up-to-date electric cranes for handling general cargo. As at the Manchester docks, every berth has direct rail and road connection. In connection with the extended wharf and railway facilities, the Canal Company acquired a considerable amount of land extending on both sides of the North Road for a distance of about 1⅛ miles, with frontage to the Ship Canal, and powers have been obtained to ensure that this large area shall have railway connection with the Canal Company's wharf and the L.M. & S. and Great Western Railways as and when industrial developments take place.

To crown all these developments the Ship Canal has been dredged to a depth of 30-ft. from Eastham locks as far up as the Gowy River at Stanlow. From there to Manchester it is 28-ft. deep.

Instead of the magnificent dock of 1843, Ellesmere Port may now be regarded as reaching from the Gowy River at Stanlow to a point about 2½ miles from Eastham locks, with deep water frontage extending for 2½ miles; a port where the largest ocean-going cargo vessels can be berthed with the maximum of safety and convenience, and where outward-bound vessels from the Port of Manchester can load down to the last foot with coal and bulk of general cargo and coal or oil bunkers.

Altogether it is clear that we are here in the presence of a port development of first-rate importance, and that the application of the business methods which have been so successful in bringing Manchester into the front rank of world ports is likely to give Ellesmere Port a high place among British ports and to give additional distinction and importance to the parent port of Manchester.

TRANSPORT FACILITIES.

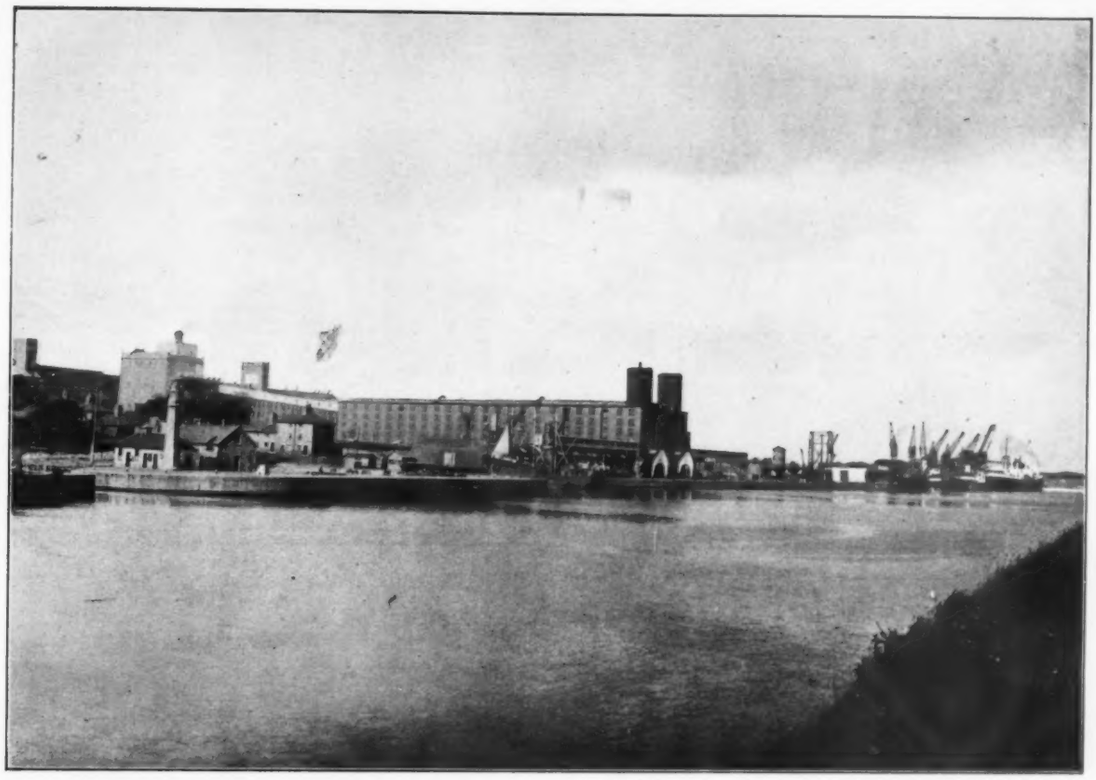
The Ship Canal Company have very largely added to the railways taken over with the old dock undertaking on the west side of Ellesmere Port Station, and, as already indicated, further large extensions are in progress and in contemplation. On the east or Stanlow side they have constructed a new network of railways connecting all the oil and industrial sites with the main line. On both sides extensive systems of railway sidings have been provided for the expeditious interchange and marshalling of traffic as well as for the storage and sorting of shipment coal. Railway traffic is here conducted under the very best modern conditions.

Through rates are quoted to and from the ship's side for all classes of traffic, and inclusive through rates, including Ship Canal toll, are quoted for the more important traffics. For the purpose of standard rates, Ellesmere Port is generally the same distance as Liverpool and Birkenhead from the industrial area of the North of England, while it is from four to nine miles nearer to the industrial areas of the Midlands.

For the convenience of road traffic the Canal Company have themselves constructed a network of roads on the east or Stanlow side connecting with all the oil and industrial sites. On the west side, in conjunction with the District Council, they have already carried out important road improvements.

The inland water transport facilities have already been touched upon. Here, also, through rate facilities can be obtained for virtually any destination in England.

Ellesmere Port Wharf Extension.



A General View of Ellesmere Port. The building with the twin towers is the Canal Company's Grain Warehouse. Beyond, on the extreme right of the picture, is the extended Wharf.

Early stages of the work on the Extension of Ellesmere Port Wharf. The ship is in the Ship Canal and beyond the Embankment lies the Mersey.

GRAIN AND COAL.

It has fallen to the lot of Ellesmere Port in no small degree to develop the handling of cargoes which call for special equipment. We have seen that what has been done for oil has resulted in possibly the most modern organisation of its kind in the country. The new coaling plant at the western end of the port makes coal flow into the ships along conveyor belts almost as freely as oil flows through the pipe lines. The new deep-water wharf is laid out for two double unit coal conveyors, each capable of handling from 200 to 800 tons an hour, with a flexibility exceeding that of any plant of the kind. The coal wagons are assembled on sidings at the back of the plant, where arrangements allow for a speedy exchange of empty and full wagons. Full wagons pass on to the tips, where hydraulic tippers dispossess them of their contents. Wagons can be tipped from either end, so that no turn-table is necessary. The coal is then carried on conveyor bands over the roof of the transit sheds, and by way of a telescopic arm with a radial

The "Argyllshire" in the Manchester Ship Canal.

movement to the ship's hold. The arms have a radial adjustment over 30 degrees, and may be raised or lowered to accommodate themselves to the largest ship using the canal or to a barge with a foot or two of freeboard. The conveyors can be concentrated on the forward or after hatchways, up to a distance apart of 260-ft., without ranging the ship. The plant is electrically driven, and one double unit is already installed. This method of loading coal allows the handling of general cargo to go on at the same time between the ship and the transit sheds beneath the coaling plant, and between the transit sheds and rail and road conveyance.

A new grain conveyor system which is now being installed will not only permit of the automatic passage of grain between the ship and the grain warehouse, but will enable ocean-going ships to discharge their cargoes at the rate of 100 tons an hour direct to the private mills, of which there are three established near the canal side adjoining the grain warehouse. The same conveyor will enable the mills to deliver flour direct to coasting vessels lying in the Ship Canal.

TRADE OF THE PORT.

The biggest movements are in imported oil and exported coal, but there is a great deal of general cargo both inwards and outwards, and the volume is steadily growing. Grain, iron and steel in various forms, mining timber, wood pulp, and many kinds of road materials are amongst the principal imports, and flour and bran, galvanised iron, salt cake, chemicals, oil and by-products such as asphalt, flow outwards. Apart from the oil tonnage which has been mentioned, there were 300,000 tons of direct seaborne traffic discharged and loaded at the port in the past year, and these figures do not include the barge traffic, which reached another 300,000 tons.

INDUSTRY AT THE PORT.

On the Company's estate there are established, besides the oil companies already mentioned, such important undertakings as Ship Canal Portland Cement Manufacturers, the Colas Products Co., and the British Dyestuffs Corporation. On the old dock undertaking taken over by the Ship Canal Company are the flour mills of Spillers, Limited (late Frost & Sons), D. B. King and Imperial Flour Mills, and the timber and creosoting works of Gabriel Wade & English.

The port deserves the attention of those about to establish works. It has been shown that the transport facilities are exceptional and that there are excellent sites available. It only remains to be added that gas, electricity, and water are obtainable on favourable terms. Gas is supplied by the District Council, electric light and power are supplied by the Mersey Power Company from their super-station at Runcorn. Water is supplied by the West Cheshire Board, while ample condensing water is available locally.

The 480 workers who sat down to that excellent repast, together with their families, no doubt accounted for practically the whole population of Ellesmere Port in 1843. In 1887 the population was about 2,000, and the rateable value of the port a trifle over £8,000. To-day the port is a busy town of 20,000, and a rate of 10s. 2d. in the pound yields over £40,000. Oil and water—deep water—seem to make a surprisingly successful mixture. Ellesmere Port certainly has success by the forelock. It is a place worth watching. Its career is only begun.

Launch of the S.S. "Vaclite."

A Single-Screw Steam Oil Tanker built to the order of the Vacuum Oil Co., Ltd.

The single-screw steam oil tanker "Vaclite," which has been built to the order of the Vacuum Oil Co., Ltd., was launched from the Walker Shipyard of Sir W. G. Armstrong Whitworth & Co., Ltd., on the 12th October.

The launching ceremony was gracefully performed by Mrs. Wilson-Cross.

The principal dimensions of the vessel are: Length between perpendiculars, 385-ft.; breadth moulded, 52-ft.; depth moulded to upper deck, 30-ft.

The vessel is designed to carry 7,250 tons on a mean draught of 24-ft. 4-in., and her speed on trial when loaded to this draught will be 11¾ knots.

She is built on the Isherwood bracketless system, to Lloyd's highest class, with straight stem and elliptical stern.

There are eight main cargo tanks with oil-tight transverse bulkheads, each tank being sub-divided by two continuous longitudinal oil-tight bulkheads extending fore and aft.

Separate summer tanks are also provided on each side in way of each main oil tank. Double-bottom tanks are arranged under after boilers and under engines, arranged for boiler feed water as well as water ballast. Pump rooms are arranged between Nos. 4 and 5 tanks and also at aft end of oil compartments. Three horizontal duplex cargo oil pumps, 10-in. by 8½-in. by 12-in. stroke, are installed in each main pump room and one 8-in. by 7-in. by 10-in. is fitted in each of the four summer tank pump rooms.

For the centre No. 4 and centre No. 5 main cargo tanks two vertical duplex oil pumps, 8-in. by 7-in. by 10-in. are fitted in the midship pump room. A horizontal duplex drain pump, 6-in. by 6-in. by 6-in., is fitted in each main pump room. An 8-in. by 8-in. by 10-in. duplex horizontal oil transfer pump is fitted in the forward pump room, also an 8-in. by 8-in. by 10-in. ballast pump.

A combined steam and hand windlass is fitted on the forecastle deck. Two 7-in. by 10-in. winches with extra strong valve gearing are installed, one forward of the foremast and one in each way of main mast. Also one 8-in. by 12-in. on the after end of poop deck for warping purposes.

Steam steering gear is installed on the upper deck aft with hand gear on the poop. The steering engine is controlled by a Brown Telemotor system, also by a Sperry electrical mechanical steering apparatus, and the necessary connections for Sperry helm indicator are fitted.

Accommodation is provided for the captain and officers in steel houses on the bridge and upper bridge decks. The engineers are accommodated aft in steel houses on the poop deck, and the crew and firemen in the poop.

A hospital is fitted in the bridge space.

The vessel is fitted with a wireless telegraphy installation and she is electrically lighted throughout.

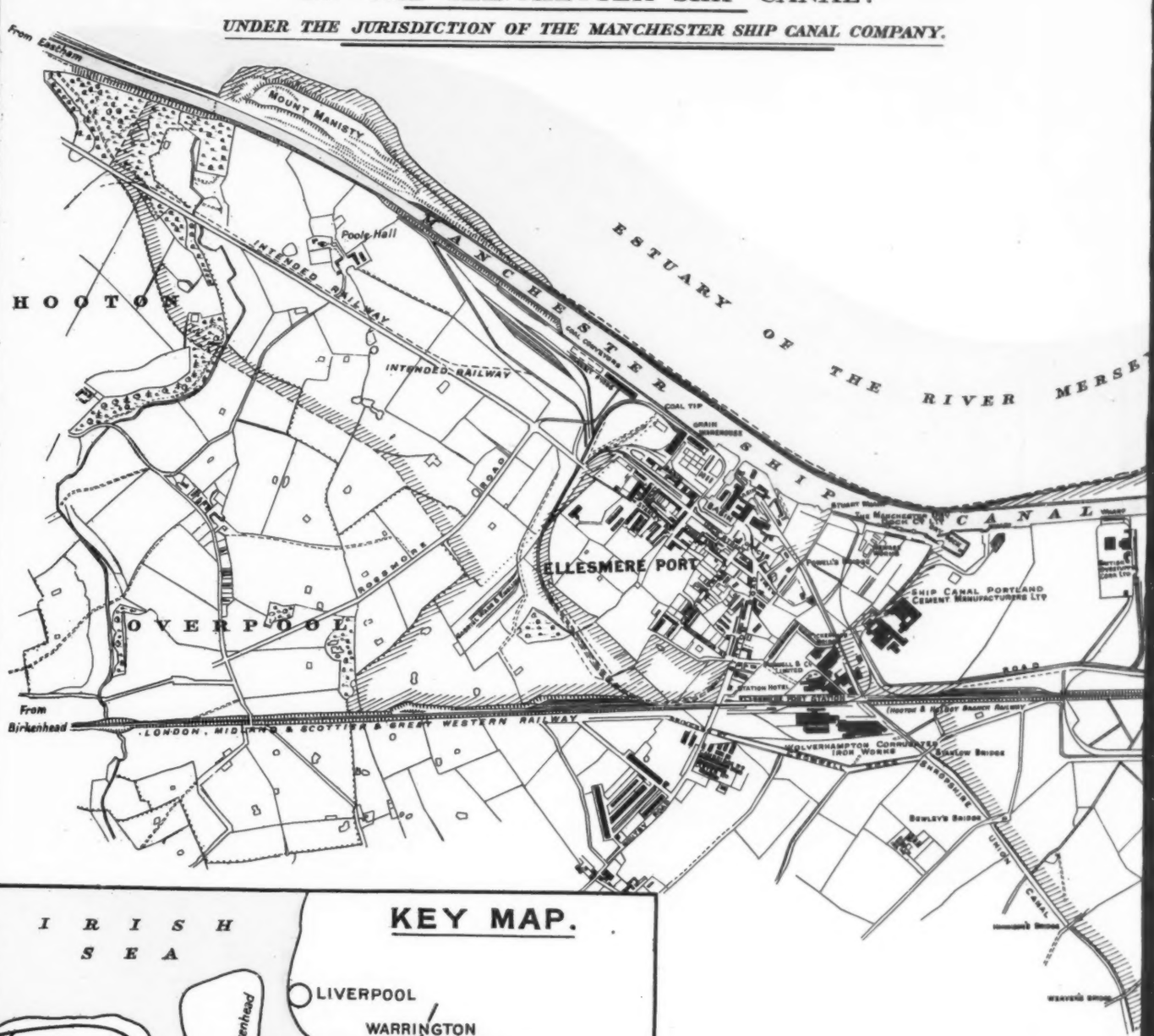
The main machinery consists of inverted direct-acting triple expansion type engine having three cylinders and three cranks with all cylinders and valves placed in line. The cylinders are 27-in., 45-in., 74-in. by 48-in. stroke. There are three single-ended cylindrical return tube type boilers to work at 180 lbs. pressure, fitted with Howden's forced draught. All fittings are suitable for Todd's latest oil-burning installation.

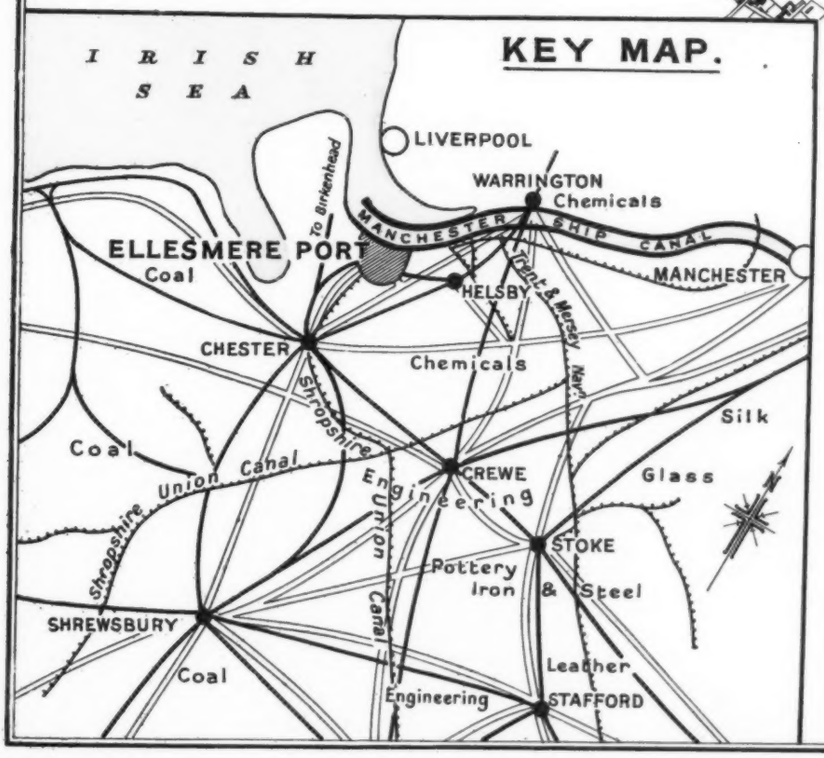
The machinery has been manufactured and installed by the Marine Engine Department of Sir W G. Armstrong, Whitworth & Co., Ltd., Scotswood.

ELLESMERE PORT

ON THE MANCHESTER SHIP CANAL.

UNDER THE JURISDICTION OF THE MANCHESTER SHIP CANAL COMPANY.





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DOCK AND HARBOUR AUTHORITY – N

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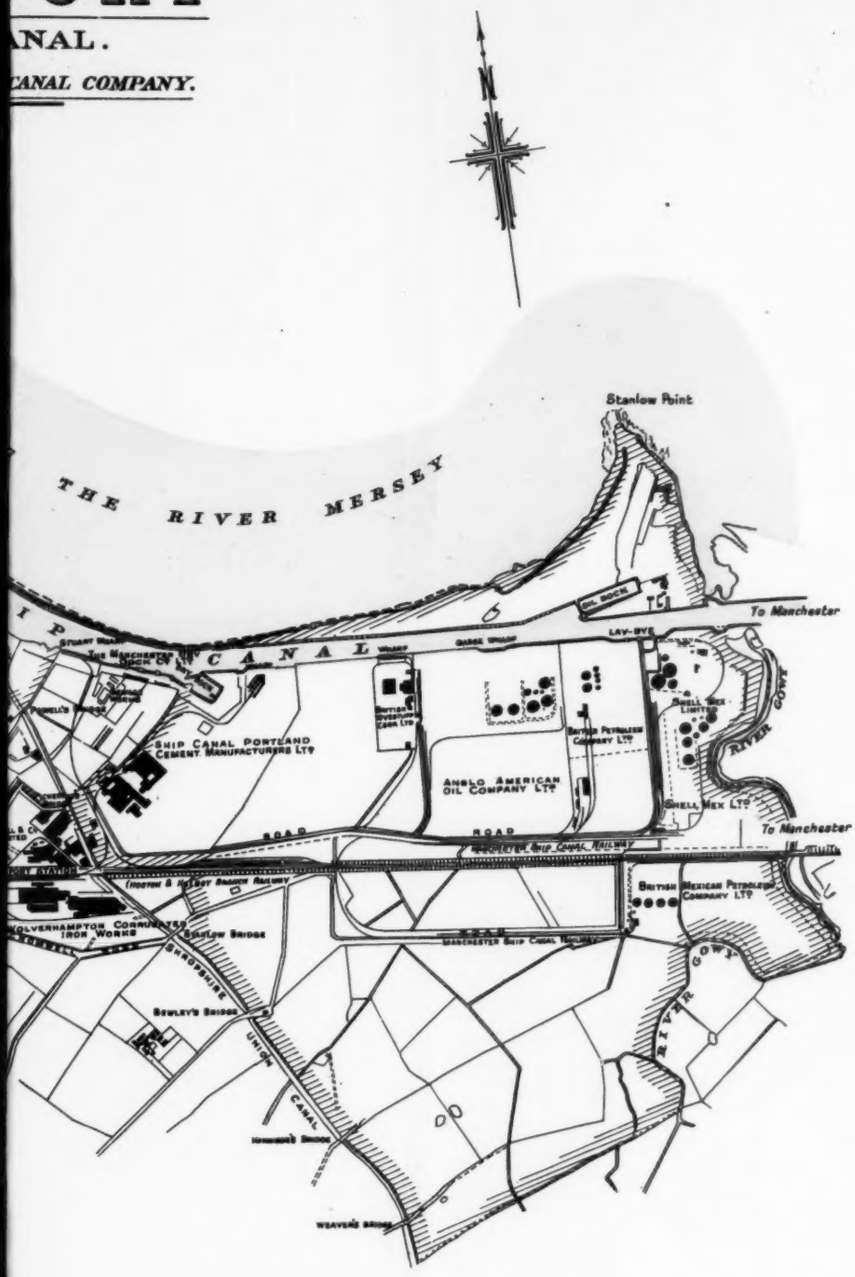

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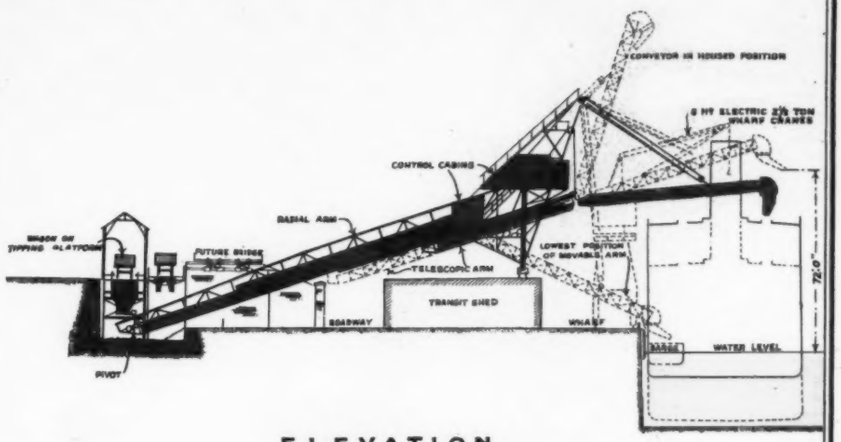
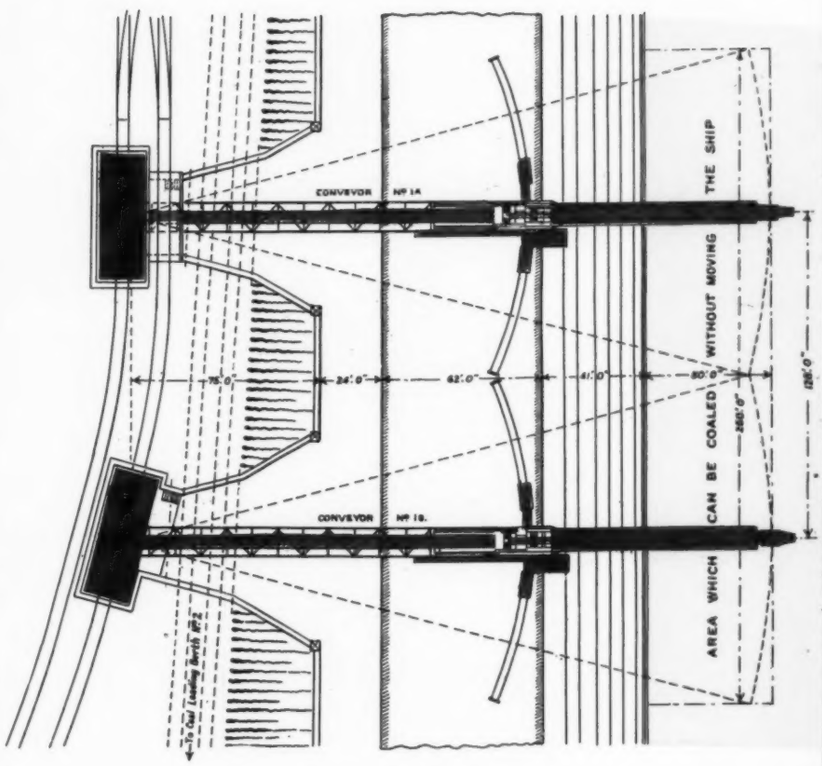


ELEVATION.



PLAN.

BAND CONVEYOR FOR LOADING COAL.

SCALE OF FEET.

Manchester Ship Canal.

An Aerial View of Eastham Locks, the entrance to the Manchester Ship Canal.

An Aerial View of Stanlow Oil Dock. While this view shows the general arrangement of the Dock and Storage Tanks, it does not illustrate the conditions at Stanlow to-day, as a great deal of development has taken place since the photograph was taken.

G.W.R. Lecture and Debating Society.

"Great Western Ports."

The first meeting of the season of the Great Western Railway Lecture and Debating Society was held at Paddington on Thursday, the 18th inst.

Sir Felix Pole, the General Manager of the Company, occupied the Chair.

A Lecture on "Great Western Ports" was given by Mr. Frank Brown, Assistant Chief Docks Manager, Great Western Railway, and illustrated by a cinematograph film of the docks and dock operations.

In his opening remarks the lecturer referred to the fact that by the operation of the Railways Act of 1921 the Great Western Railway had been for nearly seven years the owners of the world's largest dock system.

Reference was made to the period of Government control, to the unnatural conditions of commerce, shipping, finance and trade between 1919 and 1923, the consequent and prolonged slump, and the disastrous effect on basic industries.

The efficiency of the docks during the Company's ownership had been raised to a high standard, arrears of maintenance had been overtaken and large schemes of improvements carried out, with the result that the practical efficiency of the shipping facilities was now 75 per cent. greater than the present demands.

THE FILM.

The film gives a very comprehensive idea of the extent, character and operations of the vast dock system of the Great Western Railway. It takes the form of a journey, beginning at Paddington, proceeding to Cardiff, Newport, Swansea, Barry, Port Talbot, Penarth and Fishguard, and thence to Weymouth and Plymouth.

CARDIFF.

The first views of Cardiff are those of the main streets, and in particular the magnificent group of municipal and educational buildings, and also the Castle. A tour is then made of the docks. The opening of West Bute Dock nearly 100 years ago was the first important development of Cardiff as a port. Dock developments extended seaward, a large part of Cardiff Docks being built on reclaimed land. The Cardiff Docks embrace 165 acres of deep water, and are shown to be fully equipped with the latest coaling appliances, storage sidings, transit sheds, cranes, grain elevators, cold stores, etc., for dealing with the shipment of coal and the import and export of all classes of general cargo. Splendid views are shown of the United States liner s.s. "George Washington." This vessel came to Cardiff in July, 1928, and, so far, is the largest vessel to visit the Bristol Channel.

PENARTH.

Views of Penarth show the four Coal Hoists Berth, famous for its coal shipping achievements, and a cargo of wood pulp being discharged on the cargo quay for ultimate use at the Ely Paper Mills.

NEWPORT.

The next port visited is Newport. These docks, including the Town Dock, have an area of 136 acres. The South Dock, of 90 acres, possesses a very fine lock entrance 1,000-ft. long by 100-ft. wide. Views are also given of the enormous shed accommodation, extensive quayage, fully equipped with electric and hydraulic cranes, railway lines, transit sheds, etc., and the latest coal hoists capable of dealing with 20-ton wagons. Excellent views are given of large general cargo liners loading and discharging cargoes of every description to all parts of the world, including carriage and wagonwork, from Birmingham and Gloucester; tinplates, blackplates and galvanised sheets from South Wales, and case goods from the Midlands, iron and steel for the Midlands and telegraph poles for the Post Office. Of special interest are the views showing the stowing of miscellaneous cargoes in the ship's holds.

BARRY.

Over 11,000,000 tons of coal have been shipped at Barry Docks in one year. The extent of the docks is clearly shown. That Barry is not confined to the export of coal is illustrated by the views of the loading of the s.s "New Brighton" for West Africa with large quantities of cement, rails and general cargo. The large grain silos and flour mills are also shown as well as the extensive transit shed. Barry, like the other principal ports, is able to accommodate the largest type of general cargo liners.

PORT TALBOT.

Port Talbot Docks are well equipped for handling all classes of cargo though by its position it is immediately concerned with coal and heavy iron trades. In addition to numerous coal hoists, Port Talbot has several coal belt conveyors which the film shows at work. The Margam Wharf, equipped with grab transporters for conveying iron ore from ship's hold to the great new Margam Works, is also shown.

SWANSEA.

In point of deep water area, the Swansea Docks are the largest in South Wales (upwards of 300 acres). The wide range of Swansea's activities was fully demonstrated, including the work of sorting and shipping tinplates and galvanised sheets, and the operation of the "Scott" grip for avoiding damage in loading blackplates, etc. Swansea has become the largest oil port in Great Britain, this trade amounting to over 2,000,000 tons per annum.

FISHGUARD.

Apart from the large passenger traffic a very large trade is carried on in meat and dairy produce from Ireland, and particularly in cattle, sheep, pigs and horses, and the film shows active operations being carried on. Views are also given of the extensive harbour and quayage accommodation.

WEYMOUTH.

Weymouth is the great link with the Channel Islands. Apart from the enormous passenger traffic maintained by the Great Western Company's own steamers, there is a very important trade in fruit, vegetables, etc., from the Channel Islands, and busy scenes are shown.

PLYMOUTH.

The arrival and departure of Trans-Atlantic liners at Plymouth, the landing of passengers and mails by the Company's own tenders are fully depicted. Among other innovations is the belt conveyor for transferring mail bags direct from tender to railway vans. Besides the passenger traffic, Plymouth has also a large trade in sugar, grain, flour, coal, fruit, dairy produce, etc., and of special interest is the strawberry traffic from France.

The concluding section of the film is devoted to illustrations showing the excellent sites available at the respective docks for works, particularly those connected with shipment traffic.

The lecturer, in his concluding remarks, emphasised the direct bearing of South Wales' trade conditions on the finances of the Company, and stressed the importance of rehabilitation of the coal and iron trades and the need of constant endeavour to increase the range of local activities and extend the area served by South Wales ports for general overseas trade.

The General Manager, Sir Felix J. C. Pole, expressed his thanks to the lecturer, and asked for the co-operation and help of all in developing traffic by the Company's system and through the Company's ports. He emphasised the necessity for economy in traffic operations and for the introduction of improved methods at one or two places where at present there appeared to be an excessive amount of handling by manual labour. The General Manager expressed the hope that the Society would have a successful and useful session, and that the younger members would take more part in the debate than in previous years.

Mr. R. Carpmael, Assistant Chief Engineer, in proposing a vote of thanks, said he thought much good work could be done in educating the merchants and manufacturers in the facilities which the Company have provided at their ports.

KIEL CANAL TRAFFIC IN AUGUST, 1928.

A report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg states that the traffic through the Kiel Canal during the month of August was heavy, 6,170 vessels aggregating 2,143,962 net reg. tons passing through the canal. These figures show an increase against the same month in 1927 of 1,150 vessels. Compared with July the traffic shows an increase of 400 vessels aggregating 70,000 net reg. tons. Of the 6,170 vessels 2,641 were registered as sea-going steamers aggregating 1,917,644 net reg. tons and 41 motor vessels of a total net reg. tonnage of 34,197 tons. 2,502 were cargo and passenger steamers aggregating 1,912,389 net reg. tons, 138 were tugs aggregating 5,157 net reg. tons, and one fishing steamer of 98 tons, 3,217 were sailing craft aggregating 142,667 net reg. tons and 209 were lighters and barges of 45,819 net reg. tons.

The vessels were loaded as follows:—108 with passengers, 178 with coal, 145 with stone, 44 with iron, 654 with timber, 960 with grain, 28 with cattle, 722 with ore and other goods in bulk, 1,113 with piece goods, 115 with general cargo, 2,103 empty or in ballast (30 per cent. of the whole traffic).

Freight rates were somewhat higher than the preceding month. This was particularly noticeable with timber, grain and ores, whereas the rates for iron, stone and coal fell to some extent. Fishing vessel traffic was exceptionally small, but the passenger traffic increased.

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

Notes from the North.

DOCKING A BATTLESHIP.

Mersey Docks and Harbour Board, on October 12th, confirmed recommendations of two Committees concerning the certain costs in connection with the recent visit of H.M.S. "Rodney." The Pilotage Committee reported that they had under consideration the matter of the inward and outward pilotage rates chargeable in respect of the services to H.M.S. "Rodney," and they had resolved to recommend that in the special circumstances, no claim be made in regard to the services rendered to the vessel on the occasion in question. This was moved by Mr. Beazley, seconded by Mr. Tilman, and agreed to. The minutes of the Docks and Quay Committee contained a reference to the matter of the cost of docking and undocking the "Rodney," in reference to which it was recommended that the account be paid by the Board. This recommendation was also approved.

IMPROVEMENTS AT BIRKENHEAD DOCK.

A start has been made on the Great Western Railway's scheme of reconstruction and extension at the already large and important goods terminus at the Morpeth Dock, Birkenhead. The work will be done in sections, and without interference with existing traffic arrangements. When the scheme is completed the capacity of the goods station will be nearly doubled. The existing station accommodates about 540 trucks, and the new station will be able to take about 1,000 wagons. Birkenhead will thus be distinguished by having the largest and most up-to-date goods station in the North of England. The position of the town on the South bank of the Mersey—the "deep water" side—with its open access to the main-line traffic of the South, gives Birkenhead a position of some strategic importance to the Midland and Southern counties. The Great Western freight trains run right to the dockside and the main approach road opens out like a fan to an immense "grid-iron" between the main Morpeth and the Wallasey basins. Here are discharged, month by month, immense quantities of merchandise for shipment overseas, and, moreover, through Birkenhead the main traffic with Ireland and the Isle of Man is conducted. The freight service maintained by the G.W.R. between Birkenhead and London, and the South and central counties, is of excellent speed and frequency.

FLEETWOOD DOCK WORKS TO START AT ONCE.

An immediate start is to be made on the improvement and extension of the fish docks at Fleetwood, which are to cost over £100,000. Although the date of completion is indefinite, work will be pushed on as rapidly as is possible, without interfering unduly with the working of the fishing industry. The intention of the L.M.S. Railway Company, who are the owners of the Fish Docks, is not to wait for a further expansion of the fishing industry at the port, but to have in existence the facilities ready for dealing with a greater volume of trade, which it is confidently anticipated will accrue. Sir Josiah Stamp, the President of the L.M.S. Railway Company, states that the idea is to provide further facilities for the fishing industry at Fleetwood, in the belief that by doing so they will not only encourage more trawlers to come to the port, but enable the present volume of business to be more expeditiously dealt with. The engineering staff is engaged on final measurements and other details preparatory to asking for tenders. The scheme involves the taking away of lines of metals already much congested, and providing temporary or other facilities and the removal of buildings. The improvements to be carried out are briefly as follow:—Increasing the marketing space by 50 per cent. by extending the bays; widening of the Fish Dock entrance from 43-ft. to 50-ft.; provision of 16 additional storage lofts on an upper storey above the stage; improvements to rail facilities to admit of the rapid discharge of fish from the stages; provision of a new yard for storing boxes, with connecting concrete truck ways and overhead conveyor; construction of a new berth for passenger train traffic in a position central to the market; provision of two new fitting-out berths in the Wyre Dock, and the removal of the present berth from the Fish Dock, thus freeing space for the discharge of fish.

FLEETWOOD'S CONCRETE "APRON."

The construction of a concrete "apron" fronting the section of Fleetwood's new sea wall, opposite the pumping station, which has been peculiarly subject to the most severe tidal attacks is being proceeded with. Good progress is being made and the beneficial effects of the "apron" are already apparent. The "building up" of the beach is very gratifying, and the various methods adopted to assist the accretion of sand and shingle will eventually substantially strengthen and protect the concrete bulwark against the most violent storms and fiercest tides. The concrete "apron" extends seawards for a distance of 45-ft. from the base of the wall. The projected outlay is £55,000.

PORT OF LIVERPOOL TRAFFIC RETURNS.

The monthly statistical return of the Mersey Docks and Harbour Board, issued on September 22nd, shows the disposal of foreign cargoes at Liverpool and Birkenhead during the month of August. The gross tonnage was 529,204, which was a slight decline on the previous month. Nearly 50 per cent. of this total, 257,465 tons, was taken from the ships' side by cart, lorry, or motor lorry to local warehouses, factories, mills, railway stations and shipping berths. The clearances by road motor transport to outside districts amounted to 28,356 tons. Overside deliveries of grain and other cargoes were very heavy and amounted to 174,000 tons. Railway wagons loaded on the dock estate were responsible for only 24,231 tons.

BORING UNDER THE MERSEY.

At seven points beneath the River Mersey, between the shafts at Morpeth branch dock, Birkenhead, and George's Dock, Liverpool, work has commenced on the construction of the full-sized tunnel. Operations actually began on this contract about a month before the completion of Contract No. 1. Already 7,500 cubic yards, or 3 per cent. of the total work to be done, has been excavated, and of the cast iron lining, there are now in place 452 top half rings, totalling 735-ft. in length and 50 bottom half rings, totalling 75-ft. The number of men directly employed on this contract is 470. The estimated cost of this section of the work is £1,413,601 7s. 3d., of which the estimated value of the work accomplished to date is £22,501 14s. 6d. The third contract, for which tenders have been invited, will consist of the construction of the full-sized tunnels on the Birkenhead side from the Morpeth branch dock shaft to the portals at Albion Street and Rendel Street respectively. Contract No. 4 will comprise the construction of the full-sized tunnels on the Liverpool side, from the George's Dock shaft to the portals at Old Haymarket and New Quay respectively. It should be possible to invite tenders for this contract shortly after receiving the tenders for Contract No. 3.

EXPERIMENTAL GROYNES AT LLANDUDNO.

Sanction to borrow £11,600 for sea defence works has been obtained by the Llandudno Council, at whose last meeting Mr. M. L. Mudd said the provision of groynes would not have the effect of consolidating the West Shore beach, nor was there ground for supposing that any large quantity of gravel or other material would be collected. Why not, he asked, carry out to the full extent the protective measures recommended in the surveyor's report on sea defences? The Clerk, Mr. A. Conolly, read a letter from the Ministry of Health, dealing with the Council's application for sanction to a loan of £11,637 for works of sea defences on the North and West shores. The Minister regretted that the application in June last included an extensive programme of work, the majority of which had been begun and was now nearly complete, inasmuch as the Department's technical advisers were deprived of the opportunity of commenting upon the proposals and making suggestions for their improvement. Sanction would not be withheld in respect of those works, but the Minister pointed out the risk run by the Council of having to pay costs out of revenue in regard to works for which loan sanction for any reason might be refused. The Minister had been advised that there was considerable doubt as to the efficacy of the proposed experimental groynes on the North shore, and in view of the importance of the general question of groyning in connection with the protection of the bay and promenade, it was strongly recommended that the Town Council should obtain advice from an engineer with expert knowledge of sea defence works. It was also desirable that the proposal for raising the sea wall on the West shore (estimated to cost £1,780) should also be submitted to an expert. Subject to the Board of Trade approval of works below the high water mark, there would be sanction for a loan of £948 for the cost of groynes on the West shore (which had been constructed), and for a loan of £7,885—£5,389 for the construction of protective apron on the promenade and a reinstatement on the North shore, and £2,496 for work at the West shore—including the provision of a concrete apron, a new length of sea wall, and reinforced concrete slipway and the planting of sand dunes.

TURNING GRAVEL INTO GOLD.

Fleetwood is the only town on the Fylde seaboard which is converting gravel into gold. Experts declare that the sand and shingle from the Fleetwood foreshore is the finest in the country for the varied purposes to which concrete is now applied. So great has become the demand that since January 1st, 1926, when the Council began to supply gravel in large quantities to the Fylde Water Board for the purposes of the Hodder reservoir undertaking, no fewer than 112,354 tons have been removed from the beach in front, near the westerly extremity of the Fleetwood Esplanade. The Fylde Water Board have purchased 76,265 tons, 21,063 tons have been sold to Blackpool and other builders, etc., and 15,026 tons have been used by various departments of the Council. Last year's sales amounted to 28,849 tons, for which an average price of 6s. 3d. per ton was paid. The inclusive expenditure incurred in procuring the gravel averaged 2s. 6½d. per ton, leaving a net profit to the Council of 3s. 8½d. per ton. After charging to the account the cost of constructing banks surrounding the site of the projected lagoon or boating lake, amounting to £1,411, last year's surplus was nearly £3,940

PROPOSED USE OF GEORGE'S DOCK SITE.

One of the members of the Liverpool City Council has given notice of his intention to move a resolution:—"That, having regard to the fact that the portion of the George's Dock Site which was purchased by the Corporation, is being used in connection with the works of the Mersey Tunnel Joint Committee, the Council (without in any way committing the Council to carry out a scheme for the erection of baths) authorise an application to be made to the Mersey Docks and Harbour Board for their consent to the erection of Public Baths on the site of the Chester Basin recently conveyed by the Mersey Docks and Harbour Board to the Corporation, and that if such consent be given the Baths Committee be authorised to prepare the necessary plans, sections and estimates of cost of the erection of Public Baths on the Chester Basin site, and submit the same to the Council for consideration."

RIBBLE DOCK UNDERTAKING.

To the Preston Town Council it was reported that the revenue from the Ribble Dock undertaking during the five months ended August, was £11,000 less than in the same period last year. The revenue during August was £18,364, more than £3,000 less than in the same month last year. It was stated that the Preston undertaking was not alone in this loss of trade and from information obtained, it had been found that six other ports had lost much more. Councillor Coates said he was not satisfied that they were retaining the trade of five years ago, and suggested that a report giving comparisons of the trade done during the last five years should be published in order to discover some of the weaknesses of the undertaking. The Chairman said he did not see what good such a report could do. The Ribble undertaking was suffering, along with others, because of the depressed state of trade in the country.

TENDERS ACCEPTED.

The following tenders have been accepted by the Mersey Docks and Harbour Board Works Committee:—Short link chain, Woodhouse Bros., Henry Wood & Co., Ltd.; stud link chain, J. G. Walker & Son, Ltd.; chain iron, Henry Wood & Co., Ltd.; condenser tubes, Hudson & Wright, Ltd.

218 INTERVIEWS.

Mr. K. J. Burns, Port Superintendent to the Harbour Commissioners of Vancouver, B.C., again visited Liverpool in the early part of October. He said he had had 218 interviews in this country and on the Continent, and had visited all the principal ports. He was amazed at the apparent prosperity in Germany and particularly that of Hamburg. Speaking of his tour of Liverpool Docks, Mr. Burns said he received every consideration and help from the General Manager, Mr. L. A. P. Warner, and the Assistant Manager, Colonel Hawkins.

N.Z. VISITOR TOURS LIVERPOOL DOCKS.

Sir James Parr, New Zealand Trade High Commissioner, made a tour of some of the Liverpool Docks in the Mersey Dock Board yacht "Galatea," accompanied by members of the Board, in the early part of October. He took the opportunity of inspecting the new Gladstone Dock and the facilities offered in the port for the handling of New Zealand produce. Speaking at a luncheon at the Town Hall, Sir James Parr said he wanted to express his indebtedness to the Mersey Docks and Harbour Board. Under the skilful guidance of the competent General Manager (Mr. L. A. P. Warner) that morning his party were piloted along the miles of docks, and eventually they were rewarded with a sight of the port's crowning glory, the new Gladstone Dock. Any doubt that any reasonable man might entertain as to the capacity of Liverpool for handling goods was completely dissipated by his visit to their great harbour. Their dry dock was capable of handling the greatest ship afloat, and with miles and miles of water that could berth any ship, there could be no question as to that aspect of the matter. He really came to spy out the land to see whether it might not be possible, in the interests of the New Zealand farmer, to avail themselves of Liverpool's excellent strategic facilities for the great Midland and Northern district more than they did to-day. He confessed that, personally, he was in great sympathy with any policy that would engender and bring about increased trade relations between Liverpool and New Zealand, for Liverpool was a natural port and entrepot, and he supposed that particular area carried the largest industrial population of the world. Was it possible for them to change their methods a little and get more ships to Liverpool and more of New Zealand produce among that vast population?

Belfast Harbour Notes.

A new stage in the development of the Belfast Harbour Estate came on the 22nd September, when the "Calcutta" flying boat made a trial flight between Liverpool and Belfast. The "Calcutta" came to a full stop at a mooring buoy in the Musgrave Channel, which is situated in the County Down side of the River Lagan, and adjacent to the great shipyard. The passengers aboard were afterwards transferred in a boat supplied by the Harbour Commissioners, and taken to the quay. The passengers included a number of distinguished Liverpool men, and they were formally welcomed by Mr. H. M. Pollock, M.P., who, besides being Minister of Finance in the Northern Ireland Government, is a well-known member of the Harbour Board.

The visitors were later entertained to lunch at the City Hall by the Lord Mayor of Belfast, and various complimentary references were made to the help given to the enterprise by the Harbour Board.

Mr. Pollock, in his speech said that he was not present as a representative of the Government, but as the senior member of the Harbour Board. Viewing the great enterprise, he could not but think of the old and intimate community of interests that had always existed between the relatively small port of Belfast and the vast harbour on the Mersey—the premier port in the world. It was obviously a great advantage that the intimacy and rapidity of connection between the two cities should be developed on the most scientific and up-to-date lines. "The object lesson which we had to-day gives us food for thought," he continued. "It all seems so simple, yet a dozen years ago it would have been regarded as well nigh impossible. It seems as if all time and distance is annihilated! It we can claim, in Belfast, to be in the ranks of the forward march of civilisation we must take part in this great enterprise." He concluded by stating that it would be interesting to see what would take place during the week, and wished the project every success.

Mr. H. M. Pollock, D.L., presided at a meeting of the Belfast Harbour Board. The Harbour Master reported that 298 vessels arrived at the port in the period from the 16th to the 29th September—Coastwise and cross-Channel 274; foreign 21; non-trading 3. The total tonnage of the vessels which arrived from the 1st January to the 20th September was as follows—Coastwise and cross-Channel, 1,724,339, an increase of 22,434 over the corresponding period of 1927; foreign, 462,627, a decrease of 51,164; non-trading, 51,556, an increase of 3,485; total, 2,238,552, a decrease of 25,245.

It was reported to the Works Committee that the existing Customs offices at Dufferin Dock were now inadequate, and it was decided to extend and improve the accommodation.

Two Dredgers Launched.

The launch this month of two more dredgers—one of the Bucket and one of the Grab type—for the James Dredging, Towage and Transport Company Limited of London and Southampton, brings the number of vessels specially built within the past seven years for this Company to over fifty. These comprise all types and sizes of Dredgers, Steam and Dumb Hopper Barges, Tugs and other craft specially designed for service in connection with Dredging on a large scale. The James Dredging Company's "Foremost" type is now well-known all over the world; in fact within the past twelve months "Foremost" Dredgers, Hoppers and Tugs have gone out to work in Africa, Australia and both North and South America.

The success of these vessels is undoubtedly due to the fact that they combine the most modern shipbuilding and engineering practice with a long first-hand experience in actual dredging operations over long periods in all sorts of conditions. Plant of this description demands unusual strength and staying power, and is necessarily subject to treatment which is severe in the extreme. At the same time it is probably more important to avoid a breakdown on this than on most other type of craft, as, if a stoppage is caused by a breakdown on one vessel, a whole group is immediately affected. In view of this, every detail has to be specially considered, and this can best be done on the basis of actual experience of the working of similar craft. It is for this reason that the James Dredging Company design their own plant in every detail. All the above-mentioned vessels have been designed and their construction supervised by Mr. A. Caldwell, Naval Architect to the James Dredging Company, in consultation and co-operation with Mr. L. Ross, the Company's superintendent engineer. Each ship is specially designed for its particular purpose to give the maximum amount of continuous work at the minimum working cost; wearing parts are designed to be easily and quickly repairable or replaceable, and although the keynote of the "Foremost" type is efficiency with simplicity, utility has been obtained without sacrificing appearance. Beauty is not a quality looked for in Dredging Plant, but the appearance of the "Foremost" Steam Hoppers and Tugs is very pleasing, and even the Bucket Dredgers have a rugged beauty of their own.

The Company's present building programme includes a large Twin-Screw Self-Propelling Bucket Hopper Dredger, and an 1250 horse power Self-Propelling Suction Hopper and Reclamation Dredger, both of which, when launched from a North East Coast Shipyard in a few months time, together with a number of smaller type craft, such as Motor Tugs, Hoppers, Self-Propelled Grab, etc., will add further types of "Foremost" production.

Canadian Notes.

MONTREAL'S NEW GRAIN HANDLING FACILITIES.

According to the "Shipping Register" (Montreal), of September 15th, the Montreal Harbour Commissioners expect to be able to complete early in October the new 3,000,000 bushel annex to elevator No. 3, bringing the capacity of that elevator up to 5,000,000 bushels, making it the largest elevator in the harbour.

Under the original plans it will be possible to increase further the storage capacity of this elevator by the erection of another three annexes of 3,000,000 bushels each, bringing the total capacity to 14,000,000 bushels without necessitating any alterations in the working house.

The capacity of the other elevators under the control of the Harbour Commissioners are "B," 3,500,000 bushels, No. 1, 4,000,000 bushels and No. 2, 2,662,000, so that the total capacity of the harbour will reach 15,162,000 bushels within the next few weeks.

The decision of the Commissioners to use the other three elevators solely for the export grain business and to concentrate the local deliveries at No. 3, which has been specially designed with that end in view, should result in a smoothness in handling the vast quantities of grain expected to flow through the port this fall and in obtaining the maximum efficiency from the port's facilities.

GRAIN ELEVATOR CAPACITY IN WESTERN CANADA.

According to the "Financial Post" (Toronto) of September 14th, the rapid construction of grain elevators in Western Canada has now brought the total capacity up to 203,367,000 bushels, made up as follows:—

	Bushels.
Head of Lakes	86,000,000
Pacific Coast	14,175,000
Government Elevators	12,000,000
Country Elevators	80,000,000
Private Elevators	11,192,000
Grand Total ...	203,367,000

SASKATCHEWAN WHEAT POOL ELEVATORS.

Since the formation of the Saskatchewan Wheat Pool, in 1924, a deduction of two cents. per bushel has been made from the total price due to farmer members, the money being devoted to the acquisition of elevator facilities. Another deduction, varying from one-half to 1 per cent. of the gross selling price of "Pool" grain has been made each year for the purpose of setting up a commercial reserve. These deductions have been credited to the individual accounts of "Pool" members, and have enabled the Saskatchewan Pool Elevators, Limited, the grain-handling subsidiary of the Saskatchewan Wheat Pool, to acquire elevator facilities roughly valued at $21,000,000.

BIG GRAIN ELEVATOR FOR ST. JOHN, N.B.

The St. John Harbour Commission has awarded a contract for the erection of a grain elevator in that port with a capacity of 1,500,000 bushels. The E.G.M. Cape Company, of Montreal, were the successful tenderers.

LARGE CANADIAN GRAIN SHIPMENTS IN AUGUST.

The Dominion Bureau of Statistics reports that August exports of Canadian wheat reached 25,057,171 bushels, or more than double the 12,197,098 bushels exported from Canada in August, 1927. Exports of wheat flour also increased considerably, the total being 924,646 barrels during the month as compared with 513,702 barrels in August, 1927.

Big gains were made in the export of oats, which advanced from 316,554 bushels to 2,257,548 bushels, and rye from 159,137 bushels to 979,535 bushels. Barley at 1,443,435 bushels showed a slight decline from the 1,696,462 bushels exported in August, 1927.

The total value of the principal grains and of wheat flour exported from Canada in August was $39,527,433, this figure comparing with $23,967,484 for August of last year.

WORLD SEED CONGRESS.

At a conference held recently at the Department of Agriculture in Ottawa, discussion took place of the plans for the first World Seed Congress, to be held in 1932 at Regina, Saskatchewan. All the countries in the world which produce wheat are expected to be represented.

ST. LAWRENCE RIVER IMPROVEMENTS.

The Dominion Department of Marine and Fisheries has awarded to the Montreal firm of Robertson & Janin, Limited, a contract for the construction of a series of submerged dams at Sorel Island in the St. Lawrence River, the work being part of a project to raise the water level in Montreal harbour in order to provide a minimum draught of 30-ft. at all periods of the year.

The remedial works in contemplation are expected to cost $1,500,000, and the contract just awarded is for a total of $899,000.

The remedial works are to take the form of submerged dams or weirs on two locations. The most westerly will be built at a point opposite Repentigny, about 17 miles below Montreal. Farther on, about 45 miles below Montreal, a series of six of these submerged dams is to be built across the channels separating the Sorel Islands. Loose quarried stone is to be employed, 300,000 cubic yards of material being required to bring the top of the weirs to low water level. It is expected that these structures will be completed by December, 1929.

The operation of the submerged weirs or barrages, extending part of the way across the river, but not blocking the ship channel, will be such as to curb the river in its rush to the sea, thus raising the water level in Montreal harbour.

In recent years there has been much discussion regarding the decreased water levels in the Canadian lake and river ports and principally at Montreal, the loss of water being attributed in part to the diversion by the City of Chicago, for sewage disposal purposes, of approximately 10,000 cubic feet per second.

HEAVY FREIGHT TONNAGE ON CANADIAN CANALS.

The Dominion Bureau of Statistics reports that during August more freight was transported through the St. Lawrence canals than in any previous month on record. The total tonnage reached 1,359,561 tons, exceeding the tonnage for August, 1927, by 231,044 tons, and the tonnage for June, 1927, which was the highest previously on record, by 147,958 tons.

The total freight tonnage on the Welland Canal, amounting to 1,115,601 tons, was heavier than in August, 1927, by 103,830 tons, and was exceeded only by the monthly record of 1,130,277 tons made in August, 1927.

On both the St. Lawrence Canals and the Welland canal grain traffic in August was much heavier than a year ago, wheat, barley, rye, and oats all moving in much greater volume.

L.N.E.R. Coal Staiths at Blyth.

An Up-to-date Port.

The coal shipping staiths of the London and North Eastern Railway at North and South Blyth are laid out on the gravity principle, the laden wagons being propelled up a rising approach to standage sidings on the staiths from which the wagons run by gravity to the hoppers feeding the spouts, and thence in the same way, after teeming, to the empty standage sidings. The shipping height above high water varies from 20-ft. to 31-ft. 6-in., this being increased by 14-ft. 6-in. at low water, and the spouts are arranged in pairs, 90-ft. apart, each pair forming a berth. Four berths are provided at North and South Blyth, and the distance between the berths varies from 260 to 538-ft.

In order to deal with vessels of unusual height belt conveyors have been added to the staiths and these enable an additional height of about 24-ft. to be obtained. The Handcock Anti-coalbreaker is also in use at Blyth because of the special need for careful handling of Northumberland coal.

Very high rates of shipment have been obtained at these staiths, 1,680 tons having been shipped in 1 hour 40 minutes, using one spout, or at the rate of 1,260 tons per hour. The daily record shipment at North Blyth (four berths) is 14,561 tons, and in 1923 North and South Blyth staiths together shipped nearly 4½ million tons.

At the new staiths which have recently been completed on the North side of the river, the general working arrangement, so far as layout is concerned, is similar to the staiths already mentioned but in the new staiths greater use is made of belt conveyors. Two berths are provided, each having one gravity spout, one high and one low conveyor. The shipping height varies from 13-ft. to 46-ft. 9-in. above high water, with an additional height of 14-ft. 6-in. due to the tidal range.

The new conveyors are of the self-contained traversing type, two being designed for a capacity of 800 tons per hour and two for 500 tons per hour. Fittings are provided on the ends of the conveyors to permit the attachment of an anti-coalbreaker if required, the belts are constructed of steel plates and arranged to deliver coal at an angle of 25 degrees above, and 30 degrees below the horizontal.

In the planning of these new staiths provision is made for doubling, if necessary, thus providing four berths.

SUCCESSFUL TRIALS OF THE S.S. "SINNINGTON COURT."

The single-screw cargo steamer "Sinnington Court," built to the order of the United British Steamship Co., Ltd., by Sir W. G. Armstrong, Whitworth and Co. Ltd., at their Walker Shipyard, completed her official full speed trials at sea on the 26th September, with satisfactory results.

The Owners were represented on the trial by Mr. T. Kinghorn, Marine Superintendent; the Shipbuilders by Mr. A. Shearer and Mr. J. W. Gibbeson, and the Machinery Contractors by Mr. Brackenbury.

Harbour Engineering Notes.

DIRECT CURRENT FOR DOCKYARD PURPOSES.

It is well known that power cannot be transmitted economically for any considerable distance with direct current of low pressure, so that where d.c. is employed it is usual to instal a station where the incoming a.c. is converted to d.c. In such cases it is essential to employ converting machinery of the highest efficiency and reliability, and these essentials are generally admitted to be the predominating characteristics of the modern rotary converter. This type of machine, used in conjunction with step-down transformers, provides the most efficient and reliable means of conversion.

The rotary converter is generally similar to a d.c. generator with the addition that the armature winding is connected to slip rings as well as to the commutator. The d.c. brushes are placed so as to obtain the maximum voltage generated by the armature.

The ordinary type of rotary converter gives approximately constant voltage on the d.c. side with constant a.c. voltage applied to the slip rings, the d.c. voltage usually dropping approximately 7 per cent. from no load to full load. If the a.c. at the slip rings be kept constant, a particular excitation on the field will give unity power factor at the slip rings. The amount of excitation is that which would produce the same d.c. voltage on the armature were the converter being separately driven as a d.c. generator. If the field current be reduced below this value a lagging current will be drawn from the a.c. mains; while, on the other hand, if the field current be increased, a leading alternating current will be drawn. This is due to the fact that as soon as a rotary converter is connected to an a.c. system, it must generate a counter EMF equal and opposite to the applied EMF of the system. In order to do this the total cutting of flux by the armature conductors must remain constant, whatever the conditions of the field. If the main d.c. field be weakened, this tends to reduce the total flux cutting the armature conductors, so that to restore this a lagging current immediately flows into the armature. The effective magnetising value of this current is just equal to the ampere turns which have been removed from the main field. As the d.c. field is gradually reduced, so magnetising current continues to appear, until finally, if the field current be reduced to zero, the total magnetisation of the field system is produced by the lagging magnetising current flowing into the slip rings of the armature.

In fact, a rotary converter armature when connected to the a.c. supply and running on unity power factor, may be likened to an ordinary static transformer with no magnetising current and the appearance in the converter armature of magnetising current when the d.c. field is weakened, is similar to the appearance in a transformer of a magnetising current which produces a counter EMF equal and opposite to the applied voltage.

A large number of rotary converters have been installed for running d.c. to a.c. These have been used to assist the a.c. generators at times when the a.c. system has been heavily loaded; to run at week ends on a small a.c. load when it is not economical to keep a large a.c. generator running; or to run continually inverted on a new a.c. supply until such time as the installation of a larger a.c. turbo-generator set be warranted. For this duty the special regulation of the converter is quite satisfactory if the machine be provided with an exciter. A speed limit device should be fitted to prevent the rotary attaining too high a speed should an excessive lagging current be drawn from the converter, due to a fault on the a.c. system. Equipments for inverted running require an a.c. booster or induction regulator, so that the a.c. voltage can be independently controlled

On account of its high speed and compact design the rotary converter requires little room compared with other rotary equipment, small floor space and comparatively light foundations. These latter qualities are often of great value, because the available space for the erection of large units in most works is limited. The transformers, reactance coils and induction regulators which are required under certain conditions are only electrically connected to the converter, and can be installed outside the converter substation or in a basement underneath the converters.

The rotary converter works as a synchronous motor and has the advantages of this type. When a shunt rheostat is employed, the power factor can be brought to unity, so that the converter does not set up any phase displacement in the high tension system, the current loses in the conductors thereby being reduced to the minimum.

In addition, no synchronising device is necessary for starting, this being effected in a simple manner from the a.c. side, as in the case of squirrel cage motors. The use of a transformer with each converter enables the high and low pressure circuits to be kept completely separate. As the transformer windings are usually oil immersed, and the rotary converter is subjected to low tension current only, a high degree of reliability in working is obtained, and automatic substations containing rotary converters are being used in all types of service with considerable success.

AN "ALL-ELECTRIC" MOTOR SHIP FOR AMERICA.

It is gratifying to note that America has come to this country for two of her latest and fastest passenger vessels for service between New York and South America, the vessels in question being the "Santa Maria" and the "Santa Barbara," ordered by the Grace Line of New York from the Furness Shipbuilding Co., Ltd. The first of these two vessels, of some 9,000 tons, has recently completed her trials, and is noteworthy for the most complete electric installation so far carried out on any passenger liner in the world.

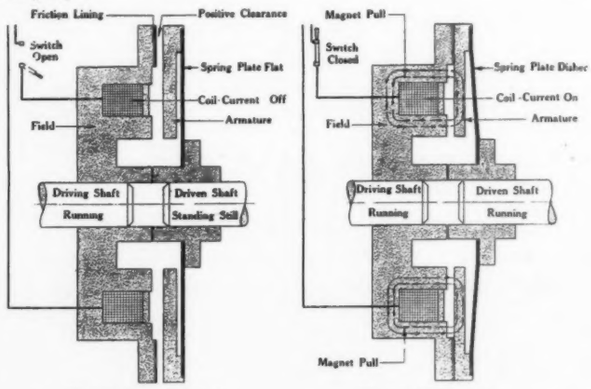
The main propulsion engines are Sulzer Diesels of the single-acting, two-stroke cycle type, each capable of developing 4,000 b.h.p. at 100 r.p.m. Many of the leading firms in this country have taken a hand in providing the engine room equipment, namely Drysdale pumps, Worthington-Simpson pumps, Weir pumps, Sharples super-centrifugal oil purifiers, Brown-Boveri scavenging blowers, and British Thomson-Houston generators.

The layout and construction of the vessel provide for continuity of all electric services in the most adverse circumstances and all electrical gear is thoroughly fool-proof. All pumps, winches and the windlass are motor driven, and the steering gear, refrigeration, galley and pantry cooking and smoke room cooking are all electrically operated. The steering gear is of the electro-hydraulic type, a telemotor control gear is fitted and the Sperry gyro electric control system is fitted to the steering gear. A complete system of gyro compasses, automatic pilot, automatic course recorder and high powered searchlights are also fitted.

The ship's laundry is "all-electric," as well as the galleys and bakery, "Hotpoint" cooking equipment being provided. Other electric equipment includes the ventilation plant for the passengers and crew, the boat hoists, the lighting throughout the vessel, fires in the public and state rooms, while an outbreak of fire in any part of the vessel or the slightest trace of smoke in any of the holds rings an alarm in the wheelhouse and at the same time indicates the zone of the trouble.

SYNCHRONOUS MOTOR DRIVES IN DOCKYARDS.

With the increasing application of electrical drives in dockyards for all purposes, more and more attention is being paid at the present time to the question of improving the power factor of the entire dockyard plant, and the introduction of the modern types of synchronous motor has greatly facilitated the maintenance of a good power factor throughout the yard with the consequent minimising of the power bill, whether power is generated on the site or purchased from a public supply company.

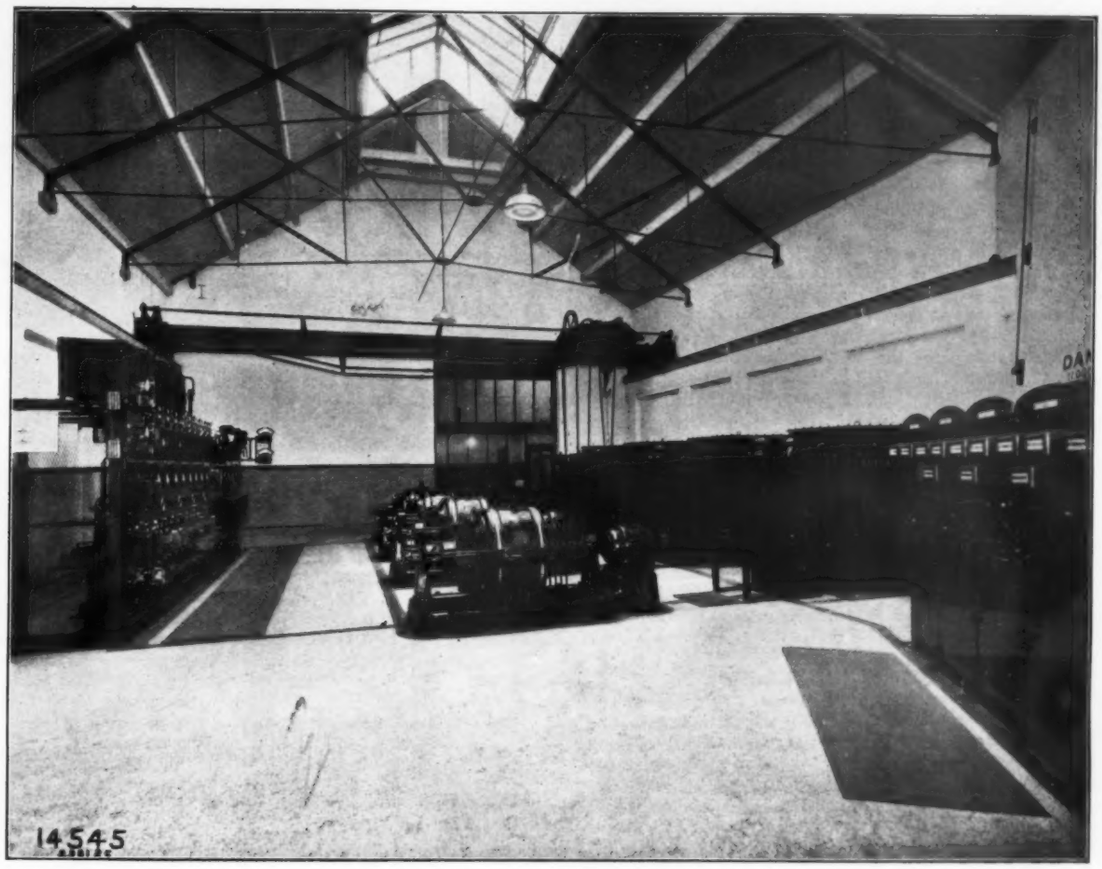


Clutch Disengaged. Clutch Engaged.

There exists a wide field of application for which synchronous motors are specially suitable, as this type of motor has the advantage that it can be operated at unity or even leading power factor, whereas the induction motor, unless it is fitted with a phase advancer or similar device, must run with a power factor lower than unity and lagging. The power factor at which an induction motor will run depends upon several circumstances, but, speaking generally, the lower the speed for which the motor is built, and the lower the load at which the motor is operating, the lower will be the power factor. An induction motor running light on the supply system draws practically lagging wattless current only from the line.

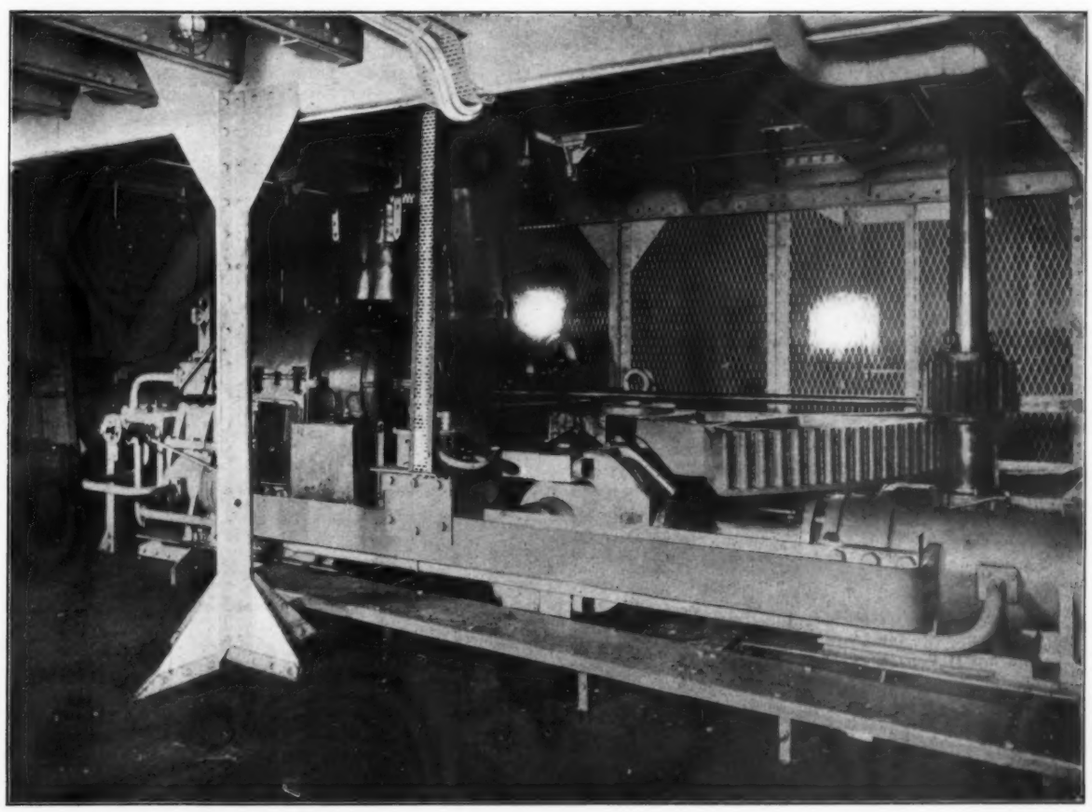
Until quite recently, synchronous motors of the salient pole type have been exclusively employed, but their use has necessarily been confined to those applications where the service conditions have been met by a starting torque up to one-half of full load torque. This limitation to the use of the synchronous motor has now been overcome, and the advantages of unity or leading power factor operation can be obtained, even in cases where a starting torque up to 2½ times full load torque is required, by installing a synchronous induction motor. This motor consists practically of an ordinary slip ring induction motor provided with an exciter. It is started exactly like a slip ring induction motor, but when full speed is reached the change-over switch is thrown from the "starting" to the "running" position, thereby connecting the exciter across the rotor winding. The motor then automatically synchronises itself.

Direct Current for Dockyard Purposes.



A Rotary Converter Sub-station.

An All-Electric Motor Ship for America.



The Electro-Hydraulic Steering Gear on the M.V. "Santa Maria."

Some difficulties have been experienced in starting synchronous motors, and these difficulties have very largely been overcome in several cases by installing a magnetic clutch between the synchronous motor and the machine to be driven. These clutches are now used in various industries for transmitting from 1 to 2,000 h.p., and, where they have been properly installed and operated, they have given very excellent service.

The action of this type of clutch is perhaps most easily explained by reference to the diagram which shows an Igranic type clutch in both the disengaged and engaged positions. It will be seen from the diagram that the magnet is so placed that its direct pull produces the pressure between the friction surfaces. This direct action results in a very simple compact structure without toggle joints, pivoted arms or sliding collars.

In order to engage the clutch and so connect the motor to the machine, it is only necessary to close a switch or press a button, the operation being as simple as switching the electric light on or off. In cases where the clutch must be operated frequently, this feature is of great value.

On starting up, when current is first sent through the magnet, the magnetic pull does not attain its full value immediately, and an appreciative time interval elapses before this maximum pull becomes effective. For this reason the clutch does not seize the load, but builds up the pressure gradually and smoothly, thus starting the load gently.

From a study of the diagram it will be seen that the Igranic clutch consists of two separate members instead of the usual sliding parts employed on the mechanical clutch. One of the two members is mounted on a circular steel disc. When the magnet is energised and the two parts of the clutch are drawn together, this plate becomes slightly dished. When the clutch is de-energised, the plate springs back flat again and draws the two members apart.

The clutch is so designed that the member which contains the magnet coil may be removed without disturbing either the driving or the driven shaft.

For the friction element a flat circular ring of asbestos material is mounted on the outer periphery of the clutch member which contains the magnet coil. The friction lining is mounted on a separate cast iron ring which is split in order to facilitate removal.

A magnetic clutch is often used on a line shaft or for the purpose of driving one of a group of machines which are all driven by the same motor, or the drive may be a steam engine and the horse-power ratings cannot be obtained conveniently. In such cases the size of the magnetic clutch must be determined on the basis of the maximum torque which it will be called upon to transmit.

A "SHOCK ABSORBER" FOR PIPE LINES.

An interesting device has just been brought out by Sulzer Bros., of London, and placed on the market, as the "Afast" pipe line stabiliser, which serves the purpose of protecting pipe mains conveying steam, gases or fluids under pressure from the injurious effects of vibration or oscillations, which are frequently set up from pressure pulsations, unbalanced masses or other causes. It is designed not only to prevent the flanges of the mains from working loose, but also to diminish the fatigue of the pipe metal and the consequent risk of pipe breakages or explosions.

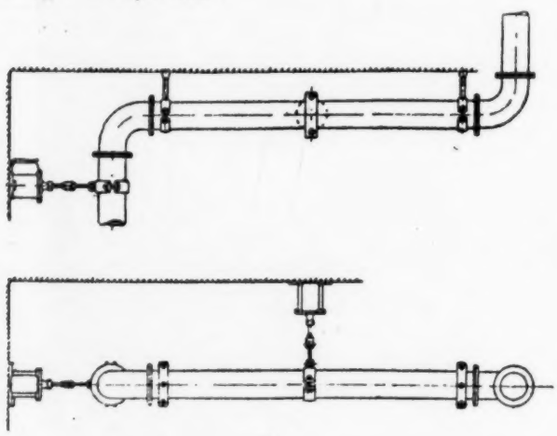


Fig. 1.

In principle, the Afast is a damping device working on the liquid dash pot principle, and whilst permitting any slow movement of a pipe line, such as expansion under heat, for instance, it will elastically oppose or absorb any vibratory movement. The device is usually fitted between two fixed supports of the pipe main, and Fig. 1 shows a typical method of application.

The complete apparatus consists of two parts: A fixed part comprising a cast iron bored-out cylinder and screwed-on cover, bolted by means of a strong flange to the wall or other fixed support; and a movable part consisting of a piston, which fits into the cylinder, with a piston rod, link and clamp. The length of the movable part can be adjusted by a fork screwed on to the piston rod. Above the cylinder is an oil well, closed by a lid, filled with oil which passes through small passages to either side of the piston so that the whole of the interior of the cylinder is kept primed with liquid. A screw gland fitted to the cylinder cover prevents any escape of oil along the piston rod. The diagram in Fig. 2 shows the movable part correctly adjusted for the mid position, i.e., when the pipe line is at rest.

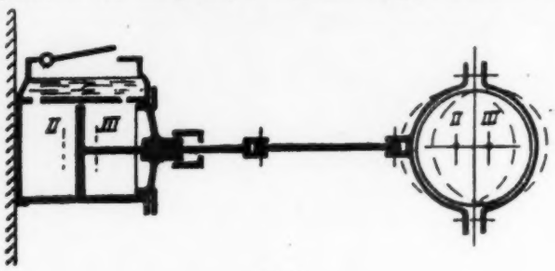
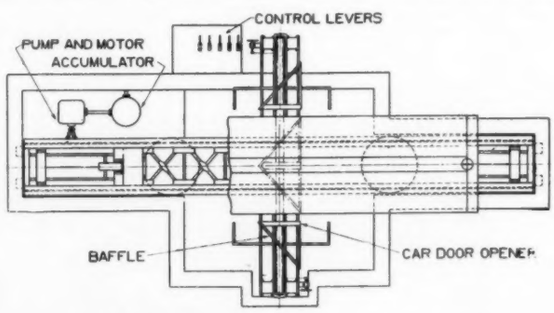


Fig. 2.

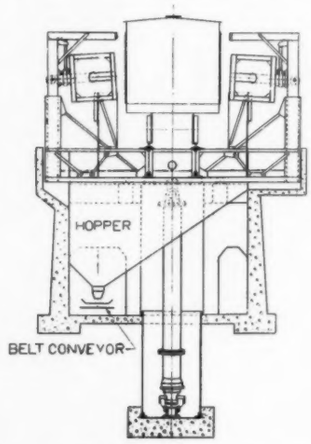
Assuming that the pipe in an undamped state vibrates between II. and III., this movement would be transmitted in exactly the same way as to the piston of a damping device not filled with oil. Owing, however, to the presence of the oil a buffering action takes place, the oil being forced out through the small rear passage into the well above, when the movement of the piston is toward the wall and an amount of oil equal to that displaced enters by the other passage to the front side of the piston. Similarly the outward movement of the pipe toward position III. is damped by oil being squeezed through the front passage into the well above, the recharging taking place through the rear passage behind the piston. The succession of these vibrations being very rapid, in reality a very small displacement of oil from one side of the piston to the other takes place, and the movement of the pipe is reduced to within safe limits. The Afast is made in two sizes, for pipes up to 4-in., and for pipes above 4-in. in diameter.

NEW TYPE OF HYDRAULIC TRUCK DUMPER.

A new type of hydraulic truck dumper has recently been introduced in America by means of which it is claimed that a truckload of grain can be unloaded in four minutes from the time it has been placed in the dumper to the time it is ready



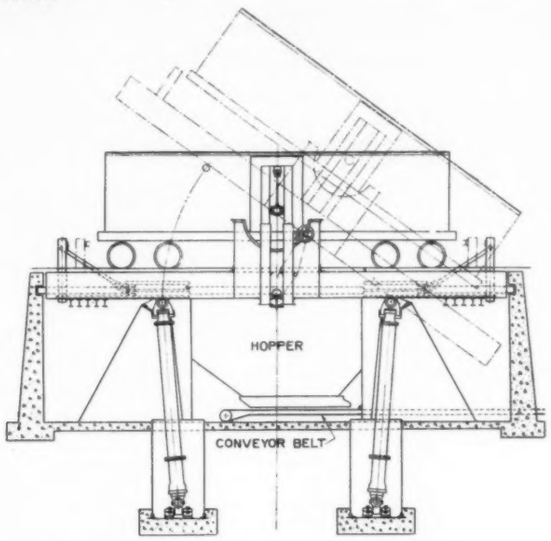
for removal. In this space of time the truck is locked centrally on the bridge, the grain doors on both sides loosened and pushed in by hydraulic power, the car tilted to an angle of 35 degs. first in one direction and then in the other, discharging the grain simultaneously through both doors, and the truck unlocked ready for removal. Additional time must be allowed



for placing the full truck on the dumper, removing the empty truck and for the removal of the grain doors from the truck by manual labour after they have been pushed in by power.

After the doors are removed, the door opening mechanisms are projected further into the car, meeting at its centre and forming a baffle or deflector, which diverts the flow of grain through

the doors when the truck is tilted. While the truck is being lowered the deflectors are withdrawn, turned around and re-inserted so as to be in proper position to discharge the grain from the other end of the truck when it is tilted in the opposite direction.



All the moving parts are operated by hydraulic pressure, using oil as the compressing fluid, one pump, geared to a motor and one accumulator supplying the necessary power for the entire system. One man can easily and without changing his position operate the several valves and levers which control the various movements of the dumper, and at the same time have a clear view of the dumping material. The sketches show the general arrangement of the dumper and pit.

ECONOMISING SPACE IN ELECTRICAL DRIVES.

It is well known that the adoption of electric motors for driving various machinery leads to an economy in space because the motor may be mounted, in the case of individual drives, alongside or even on the machine, while, for driving line shafting, the motor may be placed in the ceiling well out of the way. It is, however, something of a novelty to place the motors in

a tunnel under the workshops and transmit the power up through the flooring by means of belts. This has been done at one of the chief metal working factories in the country, and has proved entirely successful, the motors being well out of the way, so that the maximum light and air is available in the shop, yet the motors are easily accessible, as will be seen from the photograph. This unique plan was devised by the engineers of the British Thomson-Houston Co., and it may appeal to other plants where space is a consideration, and, where the shops are shut in by taller buildings, where full use must be made of the light and air available.

Colombo Notes.

DEEPENING OF KAYTS HARBOUR.

The question of deepening the Kayts Harbour which has been hanging fire for over a quarter of a century has at last reached a stage when a decision could be taken based on definite information. During the long period the matter has been under consideration the necessary information regarding the nature of the harbour bed was lacking and whatever schemes were considered were based on unscientific data. In 1907 the Government decided not to proceed with the work. The question was mooted again in 1925 and the Legislative Council provided a sum of Rs.5000, in the estimates for 1926-27, which was revoted in 1927-28 to investigate the nature of the harbour bed.

The Harbour Engineer, Colombo, whose department carried out the survey, has now reported to the Government two schemes for the improvement of the harbour: (1) With a basin at Kayts and a channel 12-ft. 6-in. deep to the sea for ships drawing 10-ft. is estimated to cost Rs.7,000,000. This scheme with a channel of 14-ft. 6-in. for ships drawing 12-ft. is estimated to cost Rs.10,000,000, (2) With a basin near Fort Helmenheil and a channel 12-ft. 6-in. deep to the sea for ships drawing 10-ft. is estimated to cost Rs.3,000,000. This scheme allowing for a channel of 14-ft. 6-in. deep for ships drawing 12-ft. is estimated to cost Rs. 5,400,000.

The Port dues at Kayts average about Rs.2000 per year, for about 260 vessels with a total tonnage of about 17,000.

In view of the great cost of deepening the harbour and the probable annual upkeep it is considered that the trade of the port will not warrant the expenditure necessary to carry out any of the suggested schemes. The Chairman, Colombo Port Commission, states that the expenditure would be entirely out of proportion to the results.

The present depth of the harbour varies generally from about 5-ft. to about 14-ft. at low water, while the depth of the channel to the open sea is generally about 8-ft. The bed consists of a layer of sand, mud, and shingle on the surface with hard rock at no great depth, sometimes covered with a layer of soft rock.

DONOUGHMORE REPORT AND SHIPPING.

Shipping agents in Colombo have made representations to the Ceylon Government expressing their objections to the Donoughmore Commission's recommendations that under the proposed new constitution for Ceylon, the ports and harbours should be under an unofficial minister. They are said to have suggested that these two subjects should be in charge of one of the Officers of State, the argument being that the Ceylonese Minister would not be sufficiently conversant with matters relating to shipping.

No information is at present available from the Government whether the Government is moving in the matter.

THE SINGAPORE DOCK.

The story of one of the most remarkable voyages in history was told to a Press representative by the skipper of one of the tugs attending on the gigantic Singapore Floating Dock, which is now passing Ceylon.

" Everything has gone all right up to now," said the skipper, who is no other than Capt. Parsons, " but we shall all be heartily glad when the trip is completed, for it is a really anxious task."

The only trouble encountered during the whole of the voyage occurred in the English Channel soon after the start of the journey, when for three days the tugs bravely protected their precious charge from the ravages of a westerly gale. Hawsers snapped, but were speedily replaced, although with difficulty; and the storm was finally weathered. The most wonderful feat in connection with the handling of the dock was the negotiation of the Suez Canal. Contrary to general reports, Capt. Parsons asserts that the canal was not closed to shipping when the dock was passing through. Each section was towed for six hours a day (covering approximately 40 kilometres) and was then moored for the rest of the 24 hours at a specially prepared anchorage. The journey through occupied four days, and was eventful for the fact that one section, to use Capt Parsons' own words, " went three-quarters aground." A tug put her nose to the task, however, in the nick of time and disaster was averted. A delay of three weeks was occasioned at Aden while waiting for the monsoon to abate. Capt. Parsons stated that they were so busily occupied in watching the hawsers (20-in. and 8-in. steel stranded manillas) that they had little time for recreation. The twenty men living in specially constructed cabins on each of the sections of the dock, however, were better situated, for when they desired to do so they had ample room for playing football, and could walk as many miles a day as they wanted to.

Hull and the Humber.

The latest " official " visitor to Hull has been Major-General Sir Granville de L. Ryrie, K.C.M.G., C.B., the High Commissioner of the Commonwealth of Australia, who on September 28th, made a tour of the port and was in particular favourably impressed by the facilities at the King George and Alexandra Docks, for the handling of grain, wool, fruit, meat and other Australian produce. Sir Granville in the evening was entertained at a banquet at the Guildhall, presided over by the Lord Mayor, supported by Sir Charles Barrie (Director of the London and North-Eastern Railway Company) and numerous leading representatives of the commercial and shipping interests of the port. The usual speeches couched in most happy terms were made and special reference made to the very large and growing trade between Australia and Hull. Notwithstanding the extent of this trade, Sir Granville said he thought it could be materially increased and that more ships could be run direct between Hull and Commonwealth ports to mutual advantage. During the proceedings the interesting announcement was made that Mr. T. H. Hornsby, Divisional Goods Manager of the L. & N.E.R. had been appointed Divisional General Manager for the Company in succession to the late Mr. George Davidson, who died suddenly while on holiday in Scotland. Mr. Hornsby is well known and highly esteemed in railway and commercial circles in the North of England and fully acquainted with the peculiar needs of Hull and cognizant of the great states the company have in the port. Trading interests feel that in time they will have an able and sympathetic official.

Another visitor to Hull has been Mr. K. J. Burns, Port Superintendent of the Harbour Commissioners for Vancouver, B.C., who was accompanied by Mr. R. J. McEwan, District Traffic Agent of the Canadian National Railways. Mr. Burns and his companion were conducted over the Hull Docks and were greatly interested in the immense grain silo at the King George Dock at which considerable quantities of Canadian wheat shipped at Vancouver are handled. They also interviewed the leading shipping and commercial firms with regard to the trade between Hull and Vancouver and everywhere were cordially received.

Two events connected with the industrial development of Hull, likely to have an important bearing upon the future of the port, have taken place during the past month. One of these is the announcement that the Blackburn Aeroplane Company have decided to transfer their main factory from Leeds to Brough, on the western confines of Hull, where the firm already have a subsidiary factory with aerodrome. The change-over is expected to be complete by next Spring and has been in contemplation for some time in view of the obvious advantage of having the whole of the firm's activities concentrated on one spot. In such concentration Brough is the natural selection providing as it does a factory with an aerodrome as an adjunct, and a large area of water (the Humber) for the trials of the flying boats, etc., turned out by the firm. The Blackburn Company, founded by Mr. Robert Blackburn, the present managing director, in 1909, is one of the biggest and most important British aircraft undertakings, and when working to full capacity gives employment for 1,500 men. It is felt in Hull that the Blackburn Company's development on the North of the Humber will give a new stimulus to the efforts which are being made to develop Hull as an air port of first-class importance, being as it is excellently situated geographically as a jumping-off place for Europe for a flying boat service to link up the North of England with Copenhagen (for the Scandinavian countries) and with Hamburg and Berlin, etc. A proposal, tentative in character, on these lines has been made by the German firm of Junkers. Efforts are also being made at Hull to form an Air Club to cultivate interest in aviation.

The other announcement relates to the Saltend Estate of the London and North-Eastern Railway Co., on the eastern boundary of Hull, where a thousand acres have been set apart for the purposes of industrial development. Here Distillers, Ltd., have acquired a site of three-and-a-half acres for the erection of new works in conjunction with the plant of Messrs. H. Green and Co., employed in the manufacture of industrial alcohol and recently acquired by the Distillers Co. The new extensions will incorporate plant evolved on an experimental scale by the chemists of the Distillers Co. by which hitherto ineradicable residue of water amounting to 7 per cent., is almost completely removed and 99 per cent. pure alcohol produced. The importance of this discovery is that it enables the alcohol to be mixed with petrol in any proportion and so opens up a big future for power alcohol. The Humber Conservancy Board have given consent to the proposal of the company to take 800,000 gallons of water per hour continuously from the River Humber for cooling purposes and to return it by way of Hedon Haven by means of a sump and weir, " free from any solid deleterious, maladourous or greasy matter."

The Humber Conservancy have had under consideration an enquiry made by the Board of Trade with reference to the representations made by the United Kingdom Pilots Association that the ballast rate on the Humber should be abolished. The Conservancy decided in opposition to the application and in their reply pointed out that the fundamental argument of the pilots was that it was unfair that a ship in ballast should pay 50 per cent. only of the pilotage rates, but on the other hand the opinion of the Board was that in essence it was a well-founded policy to grant a concession to a non-freight-earning ship.

There has been no alternative left to the Hull Corporation but to omit from this year's Parliamentary Bill the proposal to construct a new pier and landing stage on the Yorkshire side of the River Humber to accommodate the ferry traffic between Hull and New Holland. This has been caused by the unexpected death of Mr. George Davidson, Divisional General Manager of the London and North-Eastern Railway and the grave illness which we regret to say has terminated in his death, of Mr. H. H. Learoyd, the Town Clerk of Hull. The new landing stage whenever it is carried out must almost inevitably be a joint affair since the Hull Corporation own the land and the site of the present erection and the London and North-Eastern are, of course, the owners of the ferry steamers connecting their railways on either side of the river. The matter has been under consideration at intervals over a period of several years and the further but entirely unavoidable delay is the cause of much disappointment in the city. The preliminary stages have, however, been undertaken and plans proposed for the Hull Corporation and these have been under consideration by the Special Committee in consultation with the Docks' Engineers of the L. & N. E. R. Co. Presumably, therefore, the postponement of the scheme is only temporary and that it will be fully matured and find a place in next year's omnibus bill.

Another matter in which the Hull Corporation are concerned is the possible utilisation of a large parcel of land with a river frontage owned by the Corporation. Various proposals have been put forward with a view to the land being made available for the increased accommodation of the import timber trade, and further negotiations in which the London and North-Eastern representatives have taken part, have taken place, but without result. Briefly, the position is that the Corporation refused point blank to sell the site outright, while the railway company decline to rent it on a 21 years' lease as is suggested for the reason that such limited security of tenure would not justify them in incurring the large financial outlay necessary to lay railway lines, etc., and make the land of real service to the railway and the commercial interests of the port. At a meeting of the Hull Chamber of Commerce on October 1st, Mr. Hugh Stephenson, who presided, said that the traders of the port held strongly to the view that the Western Reservation should be made available for the purposes of trade and for establishing inter-communication between the Victoria and Alexandra Docks. It was, he added, an urgent question, especially in view of the present state of trade and commerce. It was reported that a letter had been sent to the Hull Corporation by the Secretary of the Chamber (Mr. A. Whitehead) in which he stated that the Chamber are regretful and disappointed that the Corporation were not prepared to disclose their policy with regard to the use of the land, and submitted that the responsibility now rested with that body to formulate a scheme whereby it could be made available for use by the railway company. It was felt, the letter proceeded, that as the Western Reservation had been allowed to stand practically derelict for some 40 years it should now be developed either by the Corporation or some other authority for the benefit of the commercial interests of the city. If the Corporation remained adamant on the question of the sale of the land outright a lease of 99 years was suggested as one of 21 years, was entirely impracticable. In a sense, it is fortunate that there have been considerably reduced imports of sawn wood at Hull this season or the want of the additional accommodation might have been severely felt. As it is, congestion happily has been unheard of and delays in berthing incoming timber ships reduced to an absolute minimum. In addition, the traffic has much benefitted from a new arrangement of the loading and unloading facilities at the Victoria Dock. In the daily average of bogies loaded and despatched all records have been broken. The Alexandra Dock is to be taken in hand in the same way next season.

" MONOMETER " PRODUCTS.

It is announced that Sir W. G. Armstrong Whitworth and Co., Ltd., have concluded an agreement with the Monometer Manufacturing Co. (1918) Ltd., whereby they become the sole manufacturers and distributors of the well-known range of " Monometer " Products, including Pressure Die Casting Plants, Gas and Oil Fired Temperature Controlled Furnaces for Metal Melting and Heat Treatment Processes, " Monard " Non-poisonous Case Hardening Compounds, etc.

The plant will be manufactured at the Scotswood Works of Sir W. G. Armstrong Whitworth and Co., where an extensive equipment is being installed for demonstration purposes.

The Harbour Plan of Chicago.

Development of Group of South Michigan Harbours part of Scheme advocated by Independent Committee on Chicago Harbour and Port Survey.

(Concluded from page 380.)

EARLY REQUIREMENTS.

In addition to a general plan as a guide for present and future development the early requirements of the water terminal situation in the Chicago Region might be summed up in the following statement:

(1) Improvement of local terminal service for lake package freight and passenger carriers.
(2) Initiation of projects intended to serve the Lakes-to-the-Gulf Waterway.
(3) Acquisition of essential tracts of land.

(1) LAKE TERMINALS.

Freight Tunnels.—The freight tunnels of the Chicago Tunnel Company are now as far east as Illinois Street and Peshtigo Court. An extension of not to exceed 1,800-ft. would bring this system to both sides of the Municipal Pier at places suitable for the construction of one or more elevator shafts from the tunnel to the floors of the pier. Both floors of the pier should be served and arrangements made for running the cars the full length of each pier shed.

Convenient and reasonable transfer service for all L. C. L. railroad inter-change would be provided, as well as for a considerable quantity of down-town business.

The expense involved could be divided between the Chicago Tunnel Company and the Municipal Pier administration, the former paying for the tunnels, the latter for shafts, elevators, and house tracks.

Auxiliary Breakwater.—Vessels berthed on the north side of the Municipal Pier are subject to considerable disturbance from wave action generated in the anchorage basin of nearly a mile in width between the pier and the government breakwater. An auxiliary breakwater has been built, parallel with and 450-ft. to the north of the pier, for a length of about 1,550-ft., which protects the vessels at the inner end of the pier. This breakwater should be extended about 800-ft., in order to give complete protection to the entire north side.

Rail Service.—To provide an immediate substitute for rail-lake inter-change terminals now in service on the Chicago River, an extension of the Chicago and North-western Railroad to the Municipal Pier is believed advisable. This work can be done in advance of construction of the storage yard to the south of the Pier.

The railroad tracks at the Municipal Pier will have to be located, temporarily at least, in the centre driveway, on the north side against the platform, as the present arrangement of tenants is such that a track on the south side would result in serious interference with trucking operations. On the north side the use is not so intensive but that a section of the pier could be used for rail-lake carload inter-change operations without affecting present uses materially.

At present, street cars serving the recreational features at the outer end of the pier utilise the lower driveway between the sheds. They interfere with the full use of the trucking platforms, and also with the installation of the proposed railroad tracks. Originally these cars used an incline to a track on the upper level. The resumption of use of this upper track is a simple operation and should be carried out.

Utlimately it may be necessary to widen the aprons or platforms outside the pier sheds to permit the construction of two tracks the entire length of the pier, though a drawing shows those tracks located in the centre driveway. This change would not be required, however, until the railroad inter-change business has grown to such an extent as to congest the facilities proposed on the south side of the river.

The Illinois Central Railroad connection may be obtained in the first instance by means of a car float operating between the end of the team tracks north of Randolph Street and the eastern end of the storage yard. This arrangement is not a permanent solution, but may be utilised until the harbour bridge, between the north and south sides of the mouth of the Chicago River, is constructed.

Grain Transfer.—A number of vessels in the package freight business on the Great Lakes are arranged to permit carrying partial cargoes of grain. A few of these are engaged in traffic in and out of the port of Chicago, and more would be, were it not for the difficulty of reaching the elevators on the Chicago River.

Direct delivery of grain to these vessels at the lake front would not only remove this traffic from the river and to a certain extent relieve the bridge delays to land traffic, but would also attract more ships to the port and thus stimulate trade.

A lake front elevator is neither necessary nor desirable. From existing river elevators grain could be lightered alongside the vessels at the Municipal Pier and transferred to them while taking on other cargo. A floating marine leg would do the transferring from lighter to ship; one would be sufficient at the start and more could be added as required.

The cost of the transfer equipment would be a proper charge against the port authority, for the advantage to the city by way of decreased operation of bridges and consequent delays to land traffic would more than offset the expense of providing and operating this equipment.

The cost of lightering the grain from the elevators to ship-side would be absorbed by the ship. It would be less than the cost to the ship of entering the river and proceeding direct to an elevator.

Cargo Handling.—Most lake package freight vessels handle their cargo through side hatches, an arrangement which is not favourable to the use of mechanical handling. Furthermore, the goods are not packed to withstand heavy handling, and the breakage resulting from the use of mechanical equipment would more than offset any advantage of more rapid movement. For these reasons it is not believed that the installation of cranes or similar equipment at the commercial lake terminals is justified as long as the commerce is purely internal. When an outlet to the sea is available and vessels and cargo more adapted to mechanical service enter the trade intensive use of the two piers in Chicago Harbour may justify the installation of gantry cranes of a size and capacity suited to the traffic.

(2) BARGE TERMINALS.

Since one of the basic assumptions of this investigation is that the Lakes-to-the-Gulf Waterway will be completed in five years' time, early action is desirable with reference to the provision of the requisite terminal facilities.

Crawford Avenue Barge Terminal.—The channels connecting the anchorage basin with the Chicago Drainage Canal intersect the right of way of the Atchison, Topeka and Santa Fe Railway at three places. It is proposed to build fixed bridges with 21-ft. of headroom, where this railroad crosses the connecting channels.

Where the Belt Railway of Chicago crosses the other two railroads a short distance east of Cicero Avenue, it will be necessary to raise the grades of all three lines about 4-ft. so that the headroom of 21-ft. will be available under the bridges over the channel to the anchorage basin. At the other crossings of the connecting channels only the Santa Fe Railway is involved. Since suitable access to the anchorage basin depends upon the raising of these lines, an agreement should be entered into at once to permit this change to be made.

It is understood that the plans for extending Cicero Avenue over the Drainage Canal also contemplate the raising of these lines. The changes required for the extension of Cicero Avenue may take care of part of the requirements as to headroom under the bridges. At any rate it is desirable that this raising be arranged for at once.

While the construction of the anchorage basin will not be one of the early steps in the development of the barge terminal, it would be desirable to acquire rights of way for the connections from the Drainage Canal as soon as possible.

The best location for the first unit of the barge terminal is just east of Crawford Avenue, as this location is accessible to the most important railroad connection (the Belt Railway of Chicago) and also nearest the most important through street. The work to be undertaken includes:

Widening of the Canal to 320-ft. between the Illinois Northern Railway bridge and that at Crawford Avenue. This will provide the additional width necessary to permit mooring of barges at the wharf, and also some room for storage of barges awaiting wharf service.

Construction of a transit shed 500-ft. in length near the eastern end of the widened canal section.

Construction of a ramp for street connection between Crawford Avenue and the transit shed.

Construction of track along the terminal property south-west to connect with the Belt Railway of Chicago.

The transit shed recommended for the initial unit is a two-storey structure 500-ft. long by 65-ft. wide. It has an apron on the canal side 20-ft. wide with one railroad track depressed

so that the floors of the cars will be on the same level as the floor of the shed. On the side opposite the canal is a 12-ft. platform with a canopy to protect goods in transfer between car and shed. Three tracks parallel this inner platform.

Both longitudinal walls of the shed on the first floor and on the canal side on the second floor should be provided with practically continuous doors of the rolling or vertical lift type. Landing platforms are suggested for the second floor on the canal side. Arrangements should be made for bridging the track recess in the platform on the canal side; moveable runways are the simplest device for this purpose.

Two semi-portal gantry cranes, each with a capacity of 1½ tons, should be provided for the first 500-ft. of shed, and in about the same ratio for future extensions. These will be useful in transferring heavy baled articles and other cargo between barge and shed.

A gantry crane with a lifting capacity of at least 10 tons at a radius of 60-ft. will be required for transferring heavy loads directly between cars and barges. This should operate preferably at the west end of the 500-ft. shed where two water side tracks are provided for this purpose.

Grand Calumet River.—The 5½ miles of the Grand Calumet River between its confluence with the Little Calumet and its junction with the Indiana Harbour Canal, should be improved for barge transportation as soon as all preliminaries can be arranged. The transfer of the right of way to the United States and the authorisation of the project by Congress are involved.

There are now 11 bridges over this portion of the Grand Calumet River; only one is a fixed bridge, though the draw spans of the other 10 are not operated at present. None of these structures has sufficient headroom when closed to pass tug and barge traffic, but it is not believed that the raising of any one of them so as to give sufficient headroom would be difficult if the openings of the draw came too frequently for land traffic.

If the necessary right of way is made available for this project, the government might be interested to the extent of assuming the construction and maintenance costs.

Lake Calumet Barge Harbour.—The initial development of this harbour along the lines laid down in the original Van Vlissingen Plan was provided for in a contract ordinance passed by the City Council a few years ago. This ordinance was in the nature of an agreement with the New York, Chicago and St. Louis Railroad ("Nickel Plate") by which the City of Chicago was to deed certain submerged harbour lands and grant the exclusive ownership and operation of the Harbour Belt Railroad to the "Nickel Plate" in exchange for the dredging of a central channel the entire length of the lake. Legislative authority for these grants was given by an Act of the State Assembly in 1921.

The merit of this arrangement with the New York, Chicago and St. Louis Railroad lay in the fact that the city would be able to have the entrance channel provided at a comparatively small expenditure of funds as well as to insure that some form of railroad service would be furnished to all parts of the harbour. The principal defect lay in granting to one railroad line the exclusive ownership and control of the harbour belt railroad instead of providing for its use by all railroads under equal terms as far as the belt line itself was concerned. However, the plan offered a solution and appeared to be a more practical expedient than any other suggested.

By an Act of the 1927 State Legislature the enabling Lake Calumet Harbour Act of 1921 was repealed. As the Nickel Plate Ordinance was based upon the Act of 1921 it is possible that the city is a party to a contract, the terms of which it cannot fulfil. At any rate, the situation as to the entire programme of development is changed, so it is probable that alternate schemes of improvement may be considered without placing the city in difficulties with the Nickel Plate Railroad or with the State Division of Waterways. Furthermore the City of Chicago now appears to have legislative authority to finance the project independently of other civic projects.

Accordingly it is proposed herein to undertake the project somewhat differently.

The first development in the industrial barge terminal in Lake Calumet would apply to only that portion of the harbour in the south-east end of the lake, immediately north of the entrance. The excavation of material from the entrance channel would be the first operation, the material to be deposited along the right of way of the harbour belt railroad and of the marginal street, from the entrance to the lake north for a distance of about 5,700-ft. Only sufficient material to construct the fill for the railroad and street should be dredged by the city, the balance of the dredging and filling to be done by the industries locating there.

Following this, the first unit of the harbour belt railroad and marginal street should be constructed—a single track railroad and a 40-ft. pavement being ample at the beginning. From the northern end of this piece of track an extension should be made to the east which will connect with the Chicago and Western Indiana Railroad, and Calumet Western Railway, over which the Belt Railway of Chicago and the Indiana Harbour Belt Railroad, respectively, have operating rights.

Negotiations should be entered into with these railroads with a view to having the connection built at their expense in exchange for the privilege of operating over the harbour belt railroad to and from water front industries. This operating right over the harbour belt should not be exclusive as similar arrangements should be made with other railroads as the business grows and additional connections are necessary.

As far as the City of Chicago is concerned the only expense it should be put to would be the cost of the section of the harbour belt railroad and of the necessary street approaches. Dredging, filling and bulkheading should be done by lessors or purchasers. These expenses to the city for the first unit have been estimated to be about $400,000.

Should it be necessary for the City to build the connecting railroad as well, the cost to the City would be increased by about $800,000.

In leasing the harbour property opposite the harbour belt railroad, the lessee should be required to confine such excavation as may be necessary to a channel 450-ft. wide from the entrance to the northern end of the first unit and to the slips. Dredging should be carried to a depth of 22-ft.

Approximately 8,200-ft. of water front and 153 acres of land are involved in the first development.

Units may be added towards the north merely by extending the harbour belt railroad and marginal street. To the south the construction of a bridge is involved, so operations in this direction may be delayed for some time. However, industries whose railroad service could be supplied by the Pullman Railroad could be accommodated there now.

ACQUISITION OF THE TRACTS OF LAND ESSENTIAL TO ULTIMATE DEVELOPMENTS.

The key locations for the improvement of the Inter-State Harbour near Wolf Lake are the 1,500-ft. of lake front property immediately south-east of the State line, and the 3,000-ft. of lake front park at Hammond. While it might be desirable to acquire the property in Wolf Lake necessary for railroad yard purposes as well, there is such an abundance of unoccupied property there, including even the bed of the lake which might be reclaimed for this purpose, that there appears to be no pressing need of such action at present.

The right of way for the proposed railroad connections between both the commercial and industrial sections of the port and for the Wolf Lake harbour yards, however, should be acquired before any developments along the intervening property proceed far enough to make the cost of the right of way excessive.

CONSTRUCTION PROGRAMME.

CHICAGO HARBOUR.

A logical initial project in the execution of the general programme for the improvement of facilities at Chicago Harbour would include the following:

Construction of car storage yard and transfer platform on north side of entrance to Chicago River.	
Construction of tracks on north side of centre roadway at Municipal Pier, including removal of street car tracks to upper level.	
Construction of direct rail connections to Chicago and North-western Railway tracks on Illinois Street.	
Provision of car float service between car storage yard and Illinois Central	$125,000
Provision of connection with Chicago Tunnel Company's System (shafts, elevators and pier service only)	136,000
Completion of protecting breakwater on north side of Municipal Pier	80,000

The first three items are so inter-related as to make it necessary to combine units in estimating.

The estimated cost of these three operations combined is about $1,250,000. The cost of all operations included in this project, allowing 10 per cent. for contingencies, 3 per cent. for engineering, and 2½ per cent. for interest during construction, is about ,$1,800,000.

A second project would involve the provision of 1,000-ft. of double storey pier on the south side of the entrance to the Chicago River with the necessary street and rail facilities, direct connection with the tracks of the Illinois Central Railroad being made north of Randolph Street. The cost of this project is estimated to be about $3,200,000.

The first and second projects could be reversed in order, if it were desired to substitute a development having a direct connection with the Illinois Central Railroad for one with a connection through a car float. In such event, however, it would be best to provide a Chicago Tunnel Company connection at the Municipal Pier, which would increase the cost of the first project to about $3,350,000, and reduce the cost of the second project to about $1,650,000. The annual cost of operation of the car float is estimated to be $80,000, which about offsets the difference in investment costs.

There are, therefore, to be considered: on the one hand, 2,300-ft. of pier on the north side of the river provided with tunnel service and rail connection to both the Chicago and

North-western Railway and the Illinois Central Railroad, with 600-ft. of transfer shed in addition; and on the other hand, the 2,300-ft. of pier north of the river, with no rail connection, together with 1,000-ft. of new pier on the south side of the river having connection with the Illinois Central Railroad only and also a tunnel connection. As both developments cost about the same to carry, decision should favour the improvement on the north side first.

The extension of this south side pier to the east and the construction of the railroad connection across the Chicago River would take place when the traffic justified the additional expense. As there are many contingencies involved, estimates of costs at the present time would be of little value.

CRAWFORD AVENUE BARGE TERMINAL.

In the original installation of the first development of the Crawford Avenue Barge Terminal, the Belt Railway connection east of its main tracks will be placed north of its final location as far as the foot of the 1.0 per cent. approach grade. This will avoid the necessity of constructing any retaining wall to start with, will reduce the first cost of grading, and will locate the track out of the way of the construction of the necessary retaining wall when such wall is required. This will not only reduce the first cost, but will also cause very little excess cost over installing the wall and the track in its final location. The estimated cost with a 500-ft. shed, is:

Excavation—		
Channel excavation from I.N.Ry. to Crawford Avenue		$133,300
Excavation for transit shed		75,000
Excavation for foundation for street approach to Crawford Avenue		14,300
Excavation from improved site which is placed in A. T. & S. F. connection		6,500
Excavation for main track used in fill for main track		4,200
Excavation from improved site which is placed in street approach		10,200
Excavation and borrow from spoil bank to make grade for Belt Ry. connection		6,300
Total cost of Excavation		$249,800
Bulkhead—800 lineal feet of bulkhead at $120.00		96,000
Concrete Retaining Walls—		
East of Crawford Avenue between Harbour R. R. & A. T. & S. F. Ry.	2,500	
For street approach to Crawford Avenue	14,000	
Total 16,500 cubic yards at $13		214,500
Street Paving—Granite block—12,000 sq. yds. at $7.75		93,000
Tracks—12,200 lineal feet of track at $4.60		56,100
Transit Shed and Platforms—		
Transit shed—65-ft. by 500-ft.		200,000
Platforms—both sides		12,000
Cranes—		
(1 heavy full portal 10-ton gantry at $35,000)		
(2 semi-portal 3-ton gantries at $25,000)		85,000
Electric Power line from Lockport—		
Change present 44,000 volt. line on 60-ft. steel towers from present location to just north of south right of way line of I & M Canal for entire distance of about 5 miles west from east of Central Park Avenue (I. M. Ry.) to west of 56th Avenue to place it out of the way of future development		100,000
		$1,106,400
Contingencies—10 per cent.		110,600
		$1,217,000
Engineering—3 per cent.		36,500
		$1,253,500
Interest during construction 1 year at 5 per cent. on half cost—2½ per cent.		31,308
Total for 500-ft. shed development		$1,284,808

The first extension to this original unit would be a 650-ft. addition to the shed to the north-east, pavement and tracks to be extended in the same direction as well. Additional units would then be added, as required, to the south-west. The cut through to the anchorage basin and the excavation of the basin itself would be made when congestion in the widened channel becomes too great.

LAKE CALUMET HARBOUR.

The first step would be the construction of the harbour belt railroad and the marginal street for the length of the first unit. Only enough fill would be placed to start with for a single track railroad and a granite block pavement 40-ft. wide. Costs are estimated as follows:—

Dredging and fill—367,000 cubic yards at 40c.	$146,800.00
Surfacing—19,300 square yards at 25c.	4,800.00
Paving—23,100 square yards at $7.75	179,000.00
Track—5,700-ft. at $4.60	26,200.00
Carried forward	$356,800.00
Brought forward	$356,800.00
Contingencies, 10 per cent.	35,700.00
	$392,500.00
Engineering, 3 per cent.	11,800.00
	$404,300.00
Interest during construction—9 months at 5 per cent. on half cost—1⅞ per cent.	7,600.00
Total	$411,900.00

It should be remembered that costs of filling in submerged lands, including the expense of bulk-heading, are proposed to be carried by prospective lessees.

The material for filling purposes is to come from the established channel opposite the tracts which are to be reclaimed.

The cost of the railway between the harbour belt railroad and the Chicago and Western Indiana Railroad is estimated as follows:—

Right of way	$150,000
Fill—136,500 cubic yards at $1.75	238,900
Subways—11—(built for double track)	308,000
Track—5,800-ft. single line at $4.60	26,700
	$723,600
Contingencies, 10 per cent.	72,400
	$796,000
Engineering, 3 per cent.	23,900
	$819,900
Interest during construction—9 months at 5 per cent. on half cost—1⅞ per cent.	15,400
	$835,300

PORT ADMINISTRATION.

PRESENT METHODS OF PORT MANAGEMENT AT CHICAGO.

In the introduction to his book on "Port Administration and Operation," Dr. Brysson Cunningham, of London, makes some general remarks which are peculiarly apt here:—

"All systems of port government are characterised by an attempt to meet local needs and requirements, and therefore embody certain features which are essentially good and beneficial. It will also be admitted that a number of systems exhibit obvious defects, which are undoubtedly open to criticism, if not to actual remedy; but a fair investigation will show that, in most instances, these are inherent in the conditions of the case, and that there are corresponding and countervailing advantages not to be lost sight of. So, while some ports prefer to be municipally governed, some to be autonomous, others to be proprietary; some to be individualistic, others to be the arena of competing interests; some to be polyarchies and others to be oligarchies; it may be said, in general, that each port has evolved its own system of government along lines which are most congenial to its nationality, its traditions, its genius and its bent. A well-known proverb states that every nation gets the Government it deserves. We may say that every port adopts the management it prefers."

The case of Chicago is held up in most treatises on the subject of port administration as an example where a multiplicity of jurisdiction seems to have been the choice of the people.

It may be stated in general, however, that the City of Chicago, through various agencies, exercises control over the waters adjacent to the city except insofar as its authority is curtailed by the supervisory powers of the State of Illinois and by the bridge-building, driveway-extending, or land reclaiming powers of certain other bodies.

The authority granted to the South Park Commissioners and to the Commissioners of Lincoln Park includes the power to extend the parks, boulevards, and bridges over submerged lands or navigable rivers bordering on such parks. The Park Boards also have power to release lands bordering on or penetrating into any public waters to the City for wharves, slips, docks, breakwaters, etc.

The Sanitary District of Chicago was formed pursuant to the terms of the Act of May 29th, 1889, and acts amendatory thereof. The powers granted therein are, of course, those considered sufficient and necessary to enable the district to dispose of the sewage and drainage of Chicago and environs. Included among such enabling powers are those of constructing, deepening, widening or straightening one or more main drainage channels, of building bridges thereover, and of constructing and controlling docks therein. Neither District nor Park Board, however, has any power over actual navigation nor the general traffic of watercraft. The city would be alone in this field were it not for the supervisory power of the State, which is exercised by the Department of Purchases and Construction.

This department was created by the Act of June 2nd, 1925; its jurisdiction includes all powers formerly vested in the Canal Commissioners, the Rivers and Lakes Commission, the Illinois Waterway Commission, and the Department of Public Works and Buildings as the successor of the three first-named bodies, which were abolished by said Act.

As the successor of the Canal Commissioners, the Department has the control and management of the Illinois and Michigan Canal, including its feeders, basins and appurtenances and the power to prescribe reasonable rules and regulations in respect to all matters connected with the navigation and use of the said canal, to establish and collect toll charges, and, with the permission of the Federal Government, to change and improve the canal to provide terminal and harbour facilities.

As the successor of the Rivers and Lakes Commission, the Department has jurisdiction and supervision over all rivers and lakes of the State, and no work of any kind whatsoever in any of the public waters in the State may be done without the approval of the Department.

As far as Calumet Harbour is concerned, the Department must approve the lease of any of the lands granted to the City, and has the power to insist that the harbour be maintained in accordance with the plans submitted.

It therefore appears that there are four active public bodies, independent municipal corporations with grants of power direct from the State, which have some authority over the use and occupation of public waters and submerged lands. These are the City of Chicago, the Lincoln Park Commissioners, the South Park Commissioners, and the Sanitary District of Chicago. While these rights and powers in public waters need not be extinguished, their exercise should not interfere with the execution of the plan of development of the port, and consequently, should be subject to the veto power of the port authority wherever a conflict is likely to occur. Otherwise the port plan will fail of accomplishment by reason of encroachments in areas most suitable for port development or because of other interference over which there is no control.

PORT ADMINISTRATIONS ELSEWHERE.

It is clear that the port authority as a local organisation for administrative purposes has received a recognised place in the American political scheme. Whether by sufferance, or for convenience, or by necessity, the Congress and its agencies have refrained from occupying the field of port control in several directions. Indeed, it might be said as a general proposition that port administration is largely in the hands of local authorities rather than under Federal control.

There are four important instances in this country of the direct form of State control of port affairs—Boston, Mobile, New Orleans and San Francisco. In Boston, administration is through one of the departments of the Government of the State of Massachusetts. In Mobile, New Orleans and San Francisco boards of Harbour Commissioners have been created by legislative enactments.

Indirect State control is, however, the general rule in the United States exercised through city governments or through municipalities or other local public corporations specially created by statute. There are, as previously stated, almost as many forms of organisation and kinds of corporate powers as there are ports, so there is little to be gained by trying to classify them for the purposes of exposition and study. There has been, however, a general tendency in recent years in the direction of the establishment of regional jurisdictions, due to the acceptance of the theory that a port is more than a local affair.

RECOMMENDED JURISDICTION AND POWERS.

The question of territorial jurisdiction precludes the four local bodies previously mentioned from assuming the role of port authority without statutory extension of powers as city, county and State boundary lines lie within the area over which the port development of the Chicago region will be distributed in the course of time. While the Sanitary District might annex the additional areas in Illinois necessary to give the requisite territorial jurisdiction, such a procedure (for the purposes of port exploitation) might require legislative authority, and would involve the district in activities which are foreign to its purpose and interest.

The powers to be conferred by the State upon the port authority should be broad enough for it to function in its allotted field without too many restrictions to hamper the smooth and efficient conduct of business and yet in sufficient detail to insure a clear understanding of what it can and cannot do. It should be remembered that a municipal corporation, contrary to a State, has practically no implied powers and therefore considerable detail is necessary if a wide range of activities is to be covered.

Consideration of the powers and rights granted to existing port bodies in other places where the objects to be attained are similar, leads to the general conclusion that in the local case the jurisdiction established by the State should include the following authorities:—

1.—To fix harbour lines and wharf or pierhead lines (sometimes in connection with harbour improvements).

2.—To acquire valuable property in excess of the actual requirements of authorised projects.

3.—To issue licenses or permits for water front construction.

4.—To regulate the anchorage and moorage of vessels.

5.—To acquire the necessary properties and rights and to construct and operate various water-terminal facilities.

6.—To provide terminal transportation services and fix the rates therefor.

7.—To operate warehouse and storage facilities as public warehousemen and fix the rates for the services performed.

8.—To operate a pilotage service.

9.—To buy and sell coal and other fuel and supplies for ships.

10.—To pass ordinances concerning the territory, jurisdiction and control of the port and conduct thereof.

11.—To levy taxes and issue bonds.

The situation at Chicago is different from that at most other ports in that the economic region of which the city is the focus includes parts of other States. Increased demand for port facilities may require the development of harbours in Wisconsin or Indiana.

Statutory authority to operate in another State therefore seems a desirable requisite in the present case. As all phases of the situations to be developed are not at all clear and are unlikely to be for some time, the grant of power from the State, with this end in view, necessarily must not be too detailed. A treaty between the adjoining States will be an essential step.

AIRPORTS.

INTRODUCTORY.

The relation between airports and harbour developments ordinarily is not so intimate as to warrant their consideration jointly. As carriers of passengers and goods, airplanes are neither auxiliary nor competitive to ships, so that the necessity of planning harbour works in such a manner as to focus transport agencies does not extend to the field of air transport.

At Chicago, however, it seems to be the opinion of many qualified to speak on the subject that the solution of Chicago's airport needs lies in a landing field on the lake front at a location fairly close to the business district. As such a solution would involve the pre-emption of areas available for harbours at the possible expense of plans for harbour development, it was felt in this case that there was sufficient relation between the two projects to justify the study of both in the preliminary investigation, as well as to warrant a brief presentation in this report of the requirements of the City in the way of airports and of suggestions as to how they should be met.

AIR TRANSPORT IN GENERAL.

Previous to the World War, commercial air transport was practically non-existent, though a small airship line had been organised in Germany and was struggling through the preliminary stages of developing a service connecting several of the more important cities of the Empire.

The first venture in the field of air transport that ultimately proved to be a worthy one was the inauguration of the air mail service of the U.S. Post Office Department. The first route of that service was put in operation between Washington, D.C., and New York City on May 15th, 1918. Shortly afterwards numerous airplane services were started in all parts of the world, and while there now exist many efficient and extensive air transport organisations, no one of these has a record comparable with that of the U.S. Air Mail.

Many foreign countries have adopted a policy of subsidising their air transport services, but this policy has never been considered favourably in this country, with the result that the so-called private commercial operations in Europe made much more rapid progress than those in America, with the exception of the Government-operated air mail. During the past year or so the U.S. Post Office Department has been withdrawing from the operating field in favour of contracting for service with private companies, so that the latter have been given a paying load on which to base their less secure operations in the passenger and express business. As a result, the years 1926 and 1927 have witnessed tremendous development in the operation of air transport facilities in the United States on a scale comparable to that of any other country in the world.

There are now fifteen American air-transport companies holding air mail contracts. The regularly operated routes, covered at least once daily, have a combined length of 10,000 miles, and as they are comparatively few in number, the most striking characteristic is their length. The New York—Chicago—Dallas route of the National Air Transport, for instance, is 1,726 miles long, while Pacific Air Transport has a route of 1,121 miles between Seattle and Los Angeles.

Traffic in the four leading countries in the world in the year April 1925, to March 31st, 1926, was as follows:—

Country.	Mileage Flown.	Passengers Carried.	Tons of Cargo.
Germany ...	4,650,000	133,639	1,118.00
United States	4,593,947	5,782	1,545.00
France ...	2,928,447	19,768	2,000.00
Great Britain	865,000	14,675	456.00

Regular passenger service in the United States is still in its infancy, while it is the predominating factor in Germany. This is the result of several factors, principal among which are the comparatively brief existence of the scheduled private operations in this country, the relatively higher railroad fares in Germany, and a greater sense of " air-mindedness " on the part of the average European business man. Time will rectify the first and last conditions adverse to passenger travel by air in this country, while experience and increased business along other lines, such as express and mail, may operate to decrease the large differential which now exists in America between air and rail rates.

At the beginning the proper field for air-transport was rather obscure. Many considered it as an encroachment upon the activities of the railroads. Others looked upon it only as an agency to be used in an emergency, or for advertising purposes, and, truly enough, it was little more than an experiment. It is rapidly making a field of its own, however, and in the short space of less than ten years' time has developed into a tool of business of almost equal importance with others of long standing usefulness. As a result, manufacturers are able to maintain smaller stocks of expensive parts at remote assembly plants, for the reliability of present-day air-transport makes quick deliveries of replacements possible. Banks send large cheques by air mail for collection because of the interest savings. Numerous other instances of use of this new form of transportation might be cited, but they are all covered in the general statement that the field of operation seems to lie, in this country at least, in the rapid transit of passengers and of high-class goods (i.e., mail, securities, valuables, perishables and emergency supplies). Since goods of this order, as well as persons, are now being transported in large quantities and numbers at materially less speed than air-transport can provide, there is no question but that a large amount of important business is available and will be diverted to air as rapidly as the efficiency and reliability of this new mode of transport develops.

Accordingly it is a safe assumption that air transport is destined to become an important factor in modern commercial and industrial affairs, and for this reason means of facilitating its orderly development should receive serious consideration.

AIR TRAFFIC AT CHICAGO.

The Chicago Association of Commerce quite recently made a very complete survey of the aviation situation at Chicago, particularly with regard to commercial air traffic. This survey showed, among other things, that the mileage of the air routes operated on regular schedules and centring at Chicago was greater than for any other city in the world. Reduced to a comparable basis the air route mileages centring at various large cities at the time of the survey was as follows:—

	Miles.
Chicago	5,937
New York	5,791
San Francisco	5,449
Detroit	5,423
Los Angeles	4,990
Berlin	4,170
Cairo	2,536
London	1,820
Paris	1,752

The following statistics, also taken from the survey of the Chicago Association of Commerce, apply to scheduled commercial operations at Chicago only, and are of interest:—

Number of commercial operators	5
Mileage flown yearly	3,170,003
Pounds of cargo	524,257

Air taxis and sport flyers are quite numerous at Chicago, some 61 operators being in the business. They handled 17,000 passengers, 640,000 pounds of cargo, and flew 960,000 miles during the year 1926.

While the foregoing statistics do not appear to indicate that the air traffic at Chicago is large in the absolute sense, yet when consideration is given to the fact that relatively it is greater than for any other " air centre " of importance, it is apparent that the situation merits attention. The business is growing rapidly locally as well as nationally, and another decade will witness an increase of traffic to a point where its importance may be vital.

Daily mail service is now handled over the following routes and by the companies indicated:—

Chicago—San Francisco.—Boeing Air Transport.
Chicago—New York.—National Air Transport.
Chicago—Dallas.—National Air Transport.
Chicago—Minneapolis.—North-West Airways.
Chicago—St. Louis.—Robertson Aircraft Company.
Chicago—Detroit.—Ford Motor Company.

The National Air Transport has recently inaugurated an express service between New York, Chicago and Dallas, carrying articles on a contract with the American Express Company. Passenger services also have been instituted by this line along the same route. The Boeing Air Transport now carries passengers on its Chicago—San Francisco route. These services are still in the experimental stage, but bid fair to be successful.

EXISTING LANDING FIELDS AT CHICAGO.

The survey of air transport facilities made by the Chicago Association of Commerce, referred to previously, covered the situation as to existing landing fields in the Chicago region quite thoroughly. The following information has been extracted:

LANDING FIELD FACILITIES IN THE CHICAGO DISTRICT.

Name of Field.	Kind.	Location.	Acreage.	Hangers.	Gas and Oil.	Shops.
AIR SERVICE.						
Cook County Forest Preserves	I	Irving Park Blvd. and Thatcher Road	120	One	Yes	Yes
Wheeling	T	Milwaukee Ave. Adjacent to Dam No. 1	40	—	—	—
Checkerboard	I	Des Plaines River and Roosevelt Road	40	Two	Yes	Yes
Eagle Airport	I	One-half mile S.E. Hinkley, Ill.	35	One	Yes	Yes
River Road	T	River Road at Lawrence	50	—	—	—
Downers Grove	I	63rd and Woodlawn	40	One	Yes	Yes
Pal-Waukee Airport	I	Palatine Road and Milwaukee Ave.	45	One	Yes	Yes
Eagle Flying Field	I	Elmhurst, Ill.	350	—	Yes	—
Morton Grove	T	Dempster St. at Morton Grove	64	—	Yes	—
Ford Airways Terminal	I	One mile south Lancing, Ill.	240	One	Yes	Yes
Municipal Airport	I	Cicero-Central 59th-63rd	320	Seven	Yes	Yes
Chicago Flying Club Field	T	One-half mile East River Road-Irving Park Blvd.	40	—	Yes	—
Heath Airport	T	Touhy and River Roads	80	—	Yes	Yes
Ashburn	I	83rd St. and Cicero Ave.	573-T 67-I	Eight	Yes	Yes
Cook County Forest Preserves (National Guard)	E	1st Ave. to Des Plaines River, 22nd St. N. to Sanitary Dist. property	260	—	—	—
Plainfield	I	4½ miles N. E. of Plainfield	40	—	—	—
Cedar Lake, Ind.	T	1 mile West Cedar Lake on Federal Highway No. 41	14	—	—	—
AIR TRANSPORT.						
Aurora, Ill.	T	3 miles N. of Aurora near the Central States Fair and Exposition Park	40	—	—	—
McCool, Ind.	E	McCool, Ind.	40	—	—	—
LaPorte, Ind.	E	LaPorte, Ind.	40	—	—	—
Griffith, Ind.	E	Griffith, Ind.	40	—	—	—
MILITARY.						
Great Lakes	—	Hydro Great Lakes Naval Training Station	—	Two	Yes	—
Great Lakes (Proposed Field)	—	North End of Training Station	100	—	—	—

NOTE: I—Improved. T—Temporary. E—Emergency.

Plans of the Chicago Aero Commission call for a central landing field on the lake front to serve as a terminal with a series of outlying fields to serve as construction and repair depots, where hangars, shop facilities and servicing will be available. The first of the series of these fields is now nearly completed, though it has been available for landing purposes for the past year. This field, located at 63rd and Cicero Avenue, will be one of the finest airports in the world. The cinder runway system, of which approximately one-half is now completed, will have a total length of 3½ miles of 100-ft. and 150-ft. width. Six large hangars are now completed on the field and others will be erected this year. The field is tile drained, and boundary lights have been installed on the first unit of runways. A 7½-million candle-power revolving beacon mounted on a tower has been provided for night flying. Four special five hundred million candle-power lights have been purchased, which will light up the entire 3½ miles of the runway system. Improvements have also been authorised which will beautify the field, giving it the qualities of a park. Complete service is now available to users of this field. Additional hangar sites are also available and are being rented by the city to responsible parties at the rate of $250.00 per year. The area of each hangar site in the hangar zone is 120-ft. by 200-ft.

Following is the runway system of the air port:—

East and West: 5,280-ft. by 100-ft.
North and South: 2,640-ft. by 100-ft.
North-East and South-West: 3,300-ft. by 150-ft.
North-West and South-East: 1,650-ft. by 150-ft.
North-East and South-West: 1,650-ft. by 150-ft.
Total runway area: 2,227,000 square feet.

In addition, Chicago has three more municipal fields which have been created during the past year. The Cook County Commissioners have provided a permanent field on the north-west side of Chicago, consisting of 120 acres. The Commis-

sioners have also set aside 280 acres of the forest preserve district directly adjacent to the present Government air mail field, Maywood, as a permanent field.

REQUIREMENTS OF SITUATION.

Chicago has no airport of sufficient dimensions to handle existing types of airplanes and present traffic within an hour's trucking distance of the centre of the city. The Municipal Field at 63rd Street and Cicero Avenue is the nearest improved field of consequence, and it is ten miles away. As a result, a considerable portion of the time saved by the planes in transit is consumed in local collection and delivery of cargo and passengers.

If the fullest advantage is to be taken of the increased rate of travel of this new method of transportation, it is evident that every reasonable effort should be made to reduce the time lost between the business centre and the airport. With water transportation, terminal service must be expeditious to permit the quick turn around of expensive carriers; with air transport, time is also the controlling element, but it applies more correctly to the goods than to the carrier.

Chicago is in no worse a position than most other large cities when it comes to the location of airports with respect to business centres. The comparatively large acreages involved make it difficult to obtain central locations, regardless of price; and when the question arises of clearing partially occupied areas for the purpose, costs are found to be prohibitive.

An airport of medium size of 120 acres could not be acquired and constructed within half an hour's trucking distance from the business centre of Chicago for less than $15,000,000; and to make the whole 120 acres effective for landing purposes it probably would be necessary to expend a large sum in addition for the removal of obstructive buildings on the outskirts, while the question of closing streets to through traffic over an area nearly one-half a mile square would be most serious. Complete costs would be considerably in excess of $100,000 an acre.

Chicago has an advantage over most other large cities in that it has a long stretch of frontage on Lake Michigan, along which it is practicable to reclaim submerged lands for a mile or more out into the lake, at costs varying from $25,000 to $50,000 an acre, depending upon the depth of the water.

As these submerged lands are the property of the State of Illinois they may be reclaimed for public use; hence an airport may be built along the lake, provided it can be so located as not to interfere with superior uses of the water front.

Outlying airports, which are capable of handling the business of the industrial districts and are within reasonable distance of the manufacturing establishments, are fairly well located and equipped. However, as business grows some means should be provided for the direct collection and delivery of cargo. A manufacturer should be able to make direct delivery of his shipments at the nearest field rather than have to send them to some central downtown office for later transfer to an outlying airport. If facilities are available to handle direct consignments at the airports, as well as means for rapid transfer of goods between airports, the need for a downtown landing field will be limited to the requirements of the business section alone, which comprise only a portion of the entire demand.

It is not necessary that the central airport have anything in the way of hangars or repair shops. Accommodations for arriving and departing passengers, and shelter for mail and express, will be required, but all facilities for the service of aircraft, aside from the fuelling stations, lighting arrangements and meteorological equipment, may be located at one or more outlying fields where ground space is available and not comparatively expensive.

The solution of the airport requirements in Chicago, therefore, seems to be in a field constructed along the lake front at a point convenient to the business district, where superior uses of the water front will not be interfered with, this field to be for the service of passengers and for cargo originating from or destined for the business district.

RECOMMENDED SOLUTION.

The location recommended for Chicago's central airport is a mile east of Michigan Boulevard and immediately south of 16th Street extended. This is in Harbour District Number Three, and therefore the reclamation of submerged lands reserved for harbour purposes is involved. However, since the general plan of harbour development proposed herein does not contemplate the utilisation of this area for water terminals at any time in the future, the suggested airport will not in any way interfere with the realisation of that plan. The location is lakeward of the outermost part of the park development; it is not opposite any feature of the park system, such as bathing beaches, with which it might not harmonise.

At this location the depth of water varies from 6½-ft. to 23-ft.; the average depth is about 20-ft. No unusual engineering problems are therefore involved in reclaiming the submerged area.

The shape and extent of the airport are governed largely by the direction of the prevailing winds, which are from the south-west. In this direction a runway 3,200-ft. long is provided, and this length may be increased to 4,000-ft. by utilising the space to the south-west. However, it would be better to plant this space in tough grass to serve as a final retard for 'planes over-running the tracks.

An east-west runway 2,600-ft. long is provided, also a north-south runway 2,700-ft. long.

All runways are 400-ft. in width, for landings are likely to be obscured by fog and smoke, and as much leeway should be afforded pilots as possible. It is proposed that these runways be properly drained, and planted in white clover.

Special attention should be paid to lighting this field, for the fog and smoke nuisance is a great factor, and, unless partially overcome by lighting, will restrict the usefulness of the airport.

The arrangements for fuelling 'planes, for the convenience of passengers, and for temporary shelter of cargo, are details beyond the scope of this report. No shops nor hangars are contemplated at this location.

The field will be approximately 120 acres in extent. It should not cost in excess of $6,000,000.

Launch of a Submarine.

Yet another submarine was successfully launched from the Naval Construction Works of Messrs. Vickers-Armstrongs, Limited, at Barrow-in-Furness, on Tuesday, October 2nd, when the "Captain O'Brien," the first of three submarines being constructed by that Company for the Chilian Government, was launched by Madam Costa Pellé, the wife of Admiral E. Costa Pellé (Chief of the Chilian Naval Commission in London). The other two vessels have been given the names of "Captain Thompson" and "Almirante Simpson," and will be launched within the next few months.

It will be noted that the vessels bear British names, and it is a graceful compliment to the men of our race who helped Chili in the founding of her fleet that the vessels should have been so named. It is also a matter for congratulation that the Chilian Government in the recent additions to their Navy has felt that it could not do better than entrust the building to British Shipbuilders.

These three submarines are of the British "O" Class type, of which five others have already been launched from the Barrow Yard—two for the Australian Government and three for the British Government—and it is interesting to note in passing that the "Captain O'Brien" is the 150th submarine launched at Barrow.

Before the launching ceremony took place the vessel was blessed by the Lord Bishop of Lancaster, assisted by the Reverend Father T. Calderbank.

In addition to Admiral and Madam Costa Pellé, the launch was honoured by the presence of His Excellency Don Antonio Huneeus, the Chilian Minister to the Court of St. James's, his daughter, and a distinguished company of officials of the Chilian Legation and Chilian Naval Officers at present in this country in connection with the additions to the Chilian Fleet now being built in England. The principal British Naval Officers stationed in Barrow, and higher officials of the Barrow Works were also present.

After the launching ceremony luncheon was provided in the General Offices at the Works, presided over by Commander Sir A. Trevor Dawson, Bt., who after the Toast of the Republic of Chili, which was replied to by His Excellency, Don Antonio Huneeus presented Madam Costa Pellé with a memento of the occasion. In response Admiral E. Costa Pellé proposed the Toast of the Builders, which was replied to by Commander C. W. Craven, the Managing Director of the Barrow and Newcastle Works.

Port Dues in Yugoslavia.

The Department of Overseas Trade has received from the Commercial Secretary at Belgrade the following list of official rates of exchange for the payment of port dues in Yugoslavia for the month of October, which appeared in the "Official Gazette" of the 27th September.

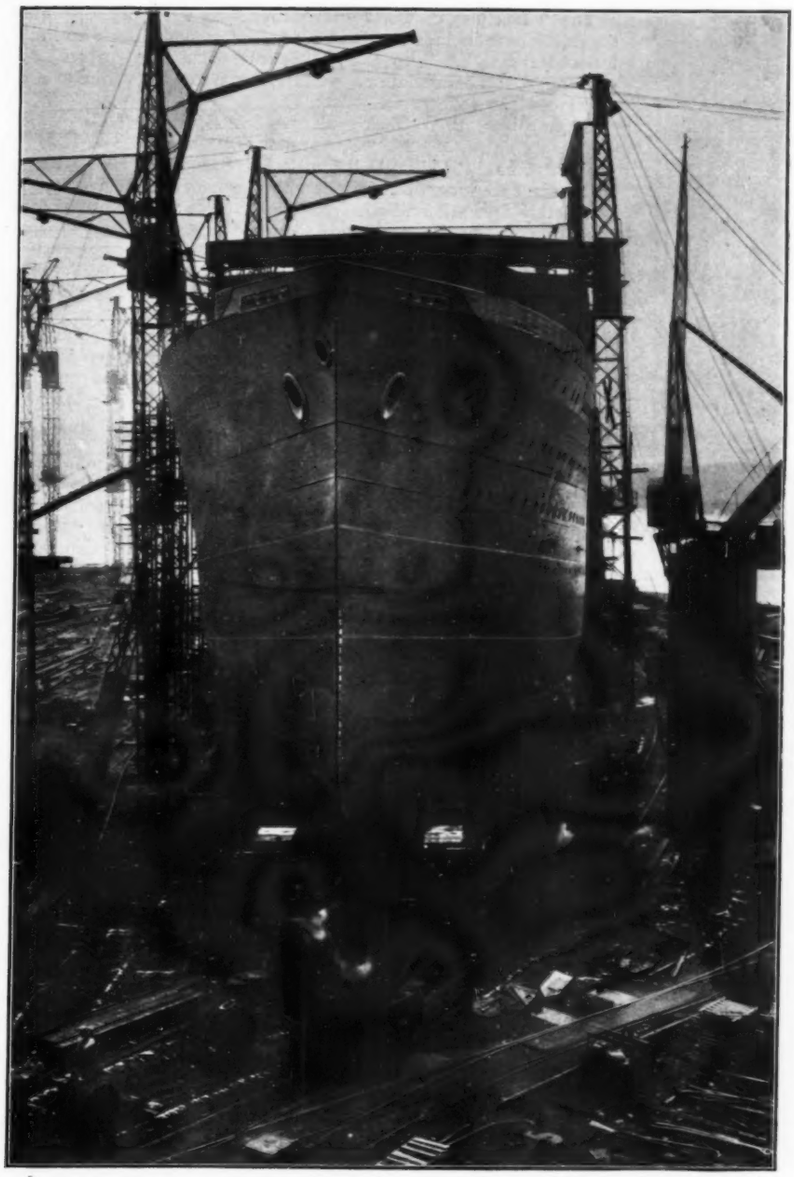
	Dinars.
1 Gold Napoleon	219.00
1 Pound Sterling	276.00
1 American Dollar	56.90
1 Canadian Dollar	56.60
1 German Mark	13.56
1 Belga	7.91
100 French Francs	222.20
100 Italian Lira	297.50
100 Dutch Florins	2282.00
100 Roumanian Leis	34.60
100 Danish Crowns	1517.00
100 Swedish Crowns	1522.50
100 Norwegian Crowns	1517.00
100 Spanish Pesetas	939.50
100 Greek Drachmas	73.60

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

The Canadian Pacific Liner "Duchess of York."

A 20,000 tons Oil Burning Liner launched at Clydebank.

THE "DUCHESS OF YORK," the youngest of the four Duchess boats that have been built on the Clyde for the Canadian Pacific, was launched at the Clydebank Shipyard of Messrs. John Brown and Company, Limited, on Friday, 28th September, 1928, by Her Royal Highness the Duchess of York, accompanied by the Duke of York and a distinguished party.



A View of the "Duchess of York," taken from the Bridge of "Duchess of Richmond."

If human wisdom is an attribute of ships—and sailors will tell you it is—the "Duchess of York" should make an exemplary exit from the land that bore her, for, hardly had her keel been laid and the first shores erected to support her growing weight when, two berths away, the "Duchess of Bedford" was launched and floated away to her outfitting berth. Another six months passed, the "Duchess of York" continued growing, deck upon deck, plate after plate, and then one day last June, in the next immediate berth, another sister, the "Duchess of Richmond," was launched and afterwards towed down stream to come to rest in an adjoining deep-water berth.

The actual, recent and prospective building programme of the Canadian Pacific is not restricted to the four "Duchess" cabin steamers, aggregating over 80,000 tons. "It is essential," said Mr. E. W. Beatty, Chairman and President of the Company, at a recent meeting of shareholders, "that in the shipping branch of the service, as in its other activities, the Company keep pace with the requirements of the trade." The enunciation of this policy, which affects passenger and freight services, coastal steamers and ocean liners, both Atlantic and Pacific, was quickly followed by action, and on Mr. Beatty's arrival in England in the summer it was announced that a contract had been given for a new "Empress" boat of over 25,000 tons, to be built in this country, and to be christened the "Empress of Japan." Her destination will be the Japan and China route. There is, moreover, every likelihood that she will be followed shortly on the stocks by an "Empress" boat for the Atlantic service.

This will bring the Canadian Pacific's new tonnage built or building in the Old Country to approximately 185,000 tons, and includes besides the "Duchess" and "Empress" boats mentioned above, the two coastal steamers "Princess Elaine" and "Princess Norah," and the five new "Beaver" class steamers recently built for the Company's fast freight service between London, Continental ports and Canada.

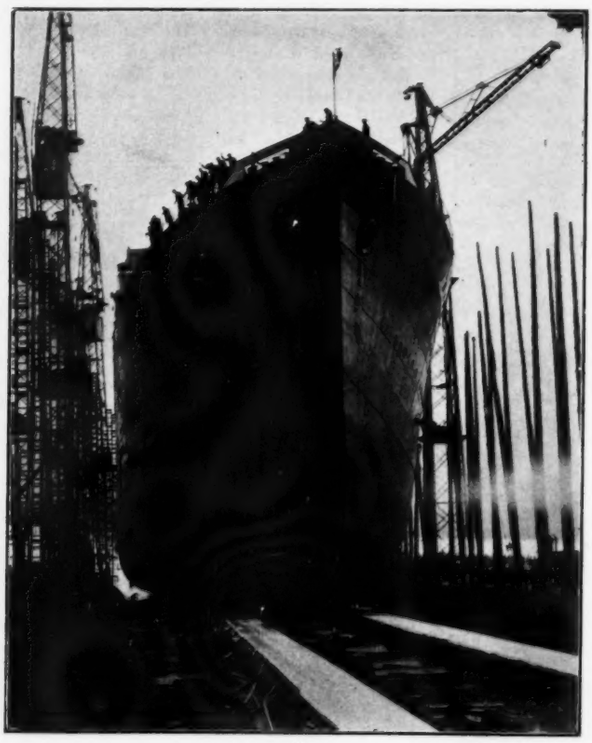
Speaking in terms of tonnage does not, however, give a correct impression of the Canadian Pacific's contribution to British shipbuilding either actually or within recent years. It can be expressed better by stating that the Company will have spent on shipbuilding in this country, including the construction of the "Empress of Japan," a sum exceeding £15,000,000 since the war, or a total aggregate of £25,000,000. Economists who have studied such matters reckon that on an average about 75 per cent. of this sum goes either directly or indirectly in wages. In other words, the Canadian Pacific will have paid into the exchequers of British wage-earning families no less than £18,750,000.

Naturally these wage-earners are not limited to the shipyards, not even to the immediate neighbourhood. There is no industry in Great Britain with so many ramifications and so many subsidiary industries interested in its welfare as is our shipbuilding industry. Wherefore it enjoys the title of Britain's Premier Industry—one of which we Britons can feel rightly and justly proud. The raw materials—metals, woods, yarns, glass, hides, paints—have to be worked and wrought in the first instance miles away from the shipyard and transported thither by road, rail or water. They are then finished and assembled in the yard, where it is calculated, on the average, 2,000 men per week are engaged for approximately two years on the construction and fitting out of a modern liner. The bigger industries keen on orders from the shipyards include producers of iron and steel; all metal workers and fitters; engineering firms; wholesale timber dealers; mills for soft furnishings; paint manufacturers; rubber suppliers; glass and china factories; decorators; manufacturers of kitchen and table ware. The list could be lengthened interminably, but sufficient will have been written to show how the millions spent in shipbuilding are spread in wages from the Midlands to the North, from Lancashire to the East Coast.

The Canadian Pacific "Duchess" Class Cabin steamships have the distinction of being the largest ships regularly to enter the Port of Montreal, the largest inland seaport in the world. They are, moreover, the largest Cabin Class steamers to have been specially designed and built as such. Both the "Duchess of Atholl" and the "Duchess of Bedford" were completed in time for this summer's transatlantic run from the Mersey to the St. Lawrence, and were immediately put on the service. The "Duchess of Richmond," now being outfitted, will inaugurate her career by a West African cruise in the coming winter. The "Duchess of York" will be commissioned in the spring, when she will be put on the Atlantic service.

In general appearance the four sisters are alike as peas, excepting in interior colour-schemes and such minor structural details as are the outcome of progress made by Britain's major industry —a progress which, be it remembered, is continual and unhalting. The following particulars in connection with the "Duchess of York" may be of interest:

Length	600	feet
Breadth	75	,,
Depth (from keel to bridge deck)	63	,,
Load Draft	27	,,
Height (from keel to top of navigating bridge)	90	,,
Height of funnels above top deck	52	,,



The Launching of the "Duchess of York."

The service speed of the "Duchess of York" will be 18½ knots, an increase of a half to one knot as compared with the "Duchess of Bedford" and the "Duchess of Atholl," but identical with that of the "Duchess of Richmond." She will do the journey from Liverpool to Montreal in seven days. Her full complement of passengers is 1,561, as under:

Cabin Class	573	passengers
Tourist Class	480	,,
Third Class	508	,,

Crew and staff number 409, so that, when fully laden, there will be roughly 2,000 lives aboard the "Duchess of York."

The "Duchess of York," like her sister ships, is an oil-burner, and as all cooking, lighting, heating, etc., are done by electricity, not a shovelful of coal need be shipped on board. She can carry 2,750 tons of oil in 30 large tanks. A special feature in her construction is the generous air-space allowed between the top of the tanks and the floor of the deck immediately above.

Like that of her sisters, the propelling machinery of the "Duchess of York" will consist of two sets of steam turbines of the latest Parsons' type, driving twin screws through single-reduction helical gearing and developing 20,000 s.h.p.. Steam for driving the turbines will be provided by six water-tube boilers of the Yarrow type suitable for working at 370 lb. pressure. In this connection it is of particular interest to note that the Canadian Pacific "Duchess" boats are the first big liners to be fitted with high-pressure water-tube boilers. Favourable comments have been made by experts on the manner in which this system has been adopted for mercantile work and on the strikingly successful results so far obtainable. Judging by the performance of the "Duchess of Atholl" and the "Duchess of Bedford," the innovation introduced by the Canadian Pacific is more than justified.

There are besides two Scotch boilers for auxiliary purposes, working under a 200 lb. pressure without super-heat. The 2,000 revs. per minute of the turbines have to be reduced to 115 revs. per minute of the propeller.

The two gear-cases, complete with wheels and pinions, will weigh 110 tons each, and will be slung bodily by means of powerful cranes from the shore into the engine-room. The two main gear wheels (it takes a month of day and night steady machining at a snail's pace to cut the gears) are 14-ft. in diameter and weigh 58 tons each. The two condensers contain each 5,000 tubes and weigh 35 tons each.

The "Duchess of York" will have, when completed, eight decks. These include the Boat Deck, Promenade Deck and six lettered from "A" to "F." Seven decks are given to passenger accommodation. Staterooms and cabins are distributed as follows:

Cabin Class, Boat Deck and "A," "B," and "C."
Tourist Third, "B," "C," and "D."
Third Class, "C," "D," and "E."

With the exception of the Boat and Promenade Decks all run completely forward and aft from stem to stern, and there are exceptionally large open and sheltered spaces available for passengers of all classes.

When completed next spring the "Duchess of York" will be as fine a ship, as intensely modern and up-to-date as the Clyde and Britain's shipbuilding industry can turn out. No expense is being spared by the Canadian Pacific to make her in every way the most perfect boat of her class and age afloat.

It is interesting to note that the eleven steamships on the list below have been launched for the Canadian Pacific in a period of one year and a day, and their tonnage is approximately 140,000.

Sir George McLaren Brown, European General Manager of the Company, has been present and spoken at all the launches with the exception of the launch of the "Duchess of Richmond," when he was unavoidably unable to attend, whilst Captain James Gillies, C.B.E., General Manager, Canadian Pacific Steamships, Ltd., has been present and spoken on all but two occasions.

In the list below it will also be noted that on no fewer than four occasions steamships have been launched on consecutive days, namely:—

"Beaverburn" and "Beaverdale," September 27th and 28th, 1927, respectively. "Princess Elaine" and "Beaverford," October 26th and 27th, 1927, respectively. "Duchess of Atholl" and "Beaverbrae," November 23rd and 24th, 1927, respectively. "Princess Norah" and "Duchess of York," September 27th and 28th, 1928, respectively.

DATES OF LAUNCHES OF CANADIAN PACIFIC STEAMSHIPS:—

Steamship.	Date.	Builders.	Christened by
"Beaverburn"	Sept. 27, 1927	Wm. Denny & Bros., Ltd., Dumbarton	Mrs. E. R. Peacock
"Beaverdale"	,, 28, ,,	Armstrong Whitworth & Co., Ltd., Walker Yard, Newcastle	Lady Northcote
"Princess Elaine"	Oct. 26, ,,	John Brown & Co., Ltd., Clydebank	Mrs. Stockwell Day
"Beaverford"	,, 27, ,,	Barclay Curle & Co., Ltd., Scotstoun	Mrs. H. Holt
"Beaverhill"	Nov. 8, ,,	Barclay Curle & Co., Ltd., Scotstcun	Miss Mavis Gillies
"Duchess of Atholl"	,, 23, ,,	Wm. Beardmore & Co., Ltd., Dalmuir	Her Grace the Duchess of Atholl, M.P.
"Beaverbrae"	,, 24, ,,	Armstrong Whitworth & Co., Ltd., Walker Yard, Newcastle	Lady Maclaren Brown
"Duchess of Bedford"	Jan. 24, 1928	John Brown & Co., Ltd., Clydebank	Mrs. Stanley Baldwin
"Duchess of Richmond"	June 18, ,,	John Brown & Co., Ltd., Clydebank	Lady Augustus Nanton
"Princess Norah"	Sept. 27, ,,	Fairfield Shipbuilding and Engineering Co., Ltd., Govan	Miss Mavis Gillies
"Duchess of York"	,, 28, ,,	John Brown & Co., Ltd., Clydebank	H.R.H. the Duchess of York

The Accuracy of Wireless Bearings.

An Instance of the Value of Beacon Stations.

The value of the combination of wireless beacon stations and the Marconi Direction Finder to navigation has been strikingly demonstrated by an experience in the Santa Barbara Channel.

The m.s. "Enton" leaving San Pedro on the Californian coast, ran into a thick fog just after entering Santa Barbara channel, but the direction finder on board was brought into use and proved once again its reliability. Having got well into the channel when the fog came on, the Master decided to keep on his voyage, relying on the bearings of the wireless beacon stations to check his position. Bearings were taken of a beacon station on the starboard bow and the ship kept on her true course until the beacon was abeam. This operation was repeated with successive beacon stations enabling the ship to proceed without delay, and keeping the Master informed of the exact position at any time despite the fog. When the fog lifted and it was possible to take visual bearings, they placed the ship almost exactly where the wireless bearings put her.

Lloyd's Register of Shipping.

Annual Report, 1927-1928.

The Society's operations, for the year under review, have shown a marked increase over those of the previous year. This is mainly attributable to two causes. In the first place, during the preceding year (1926-27) shipbuilding, and the allied industries of this country, experienced a severe depression, owing to the stoppage caused by the coal dispute. A large portion of the work which, but for this interruption, would have been included in that year was only completed during the current period, and swelled its production of tonnage accordingly. In the second place, there arose, both in this country and abroad, an unexpected and urgent demand for oil tank vessels, which could only be met by the construction of a large number of additional ships.

These conditions combined to create increased activity in shipbuilding, and this is reflected in the Society's operations for the year 1927-28.

The new vessels classed by the Society, during the year 1926-27 numbered 323, of a gross tonnage of 978,146 tons, whereas the corresponding figures for the year ended the 30th June, 1928, were 578 vessels, of 1,885,533 tons gross, including no less than 77 yachts.

The increase in the volume of work in hand, however, has been of short duration. The exceptional demand for new tonnage has been more than met, and there is now a heavy falling off in the number of vessels which have been ordered, and which are now in course of construction, the reduction being greater in Great Britain and Ireland than abroad.

During the past twelve months, plans representing 476 vessels, of 1,454,050 tons gross, were approved by the Committee of Lloyd's Register.

Japan	7	31,885
Venezuela	10	28,019
Belgium	4	21,061
Sweden	7	17,411
Germany	5	14,439
Spain	3	14,281
Argentine	15	12,649
Jugo-Slavia	3	12,397
Russia	5	12,176
France	7	10,687

For purposes of comparison, particulars of the new tonnage classed by the Society in each year from 1913-14 (the record pre-war period) are appended:—

Year.	Steam & Motor. Tons.	Sail & Non-Propelling. Tons.	Total. Tons.
1913-14	2,014,397	5,788	2,020,185
1914-15	1,289,827	5,796	1,295,623
1915-16	789,688	521	790,209
1916-17	1,371,915	4,210	1,376,125
1917-18	2,552,607	16,517	2,569,124
1918-19	3,760,806	40,415	3,801,221
1919-20	4,186,882	66,641	4,253,523
1920-21	3,229,188	15,943	3,245,131
1921-22	2,517,513	6,479	2,523,992
1922-23	1,610,624	5,601	1,616,225
1923-24	874,651	11,009	885,660
1924-25	1,311,277	4,453	1,315,730
1925-26	1,324,789	5,718	1,330,507
1926-27	967,062	11,084	978,146
1927-28	1,875,068	10,465	1,885,533

The total tonnage of merchant vessels afloat at the end of June, 1928, holding the classification of Lloyd's Register, amounted to 30,661,257 tons, and is the highest figure ever recorded in the history of the Society.

Details of this total follow:—

VESSELS CLASSED IN LLOYD'S REGISTER BOOK AT 30TH JUNE, 1928.

Material of Construction.	Description.	Great Britain and Ireland. No.	Great Britain and Ireland. Gross Tonnage.	British Dominions. No.	British Dominions. Gross Tonnage.	Other Countries. No.	Other Countries. Gross Tonnage.	Total. No.	Total. Gross Tonnage.
Steel and iron	Steam and motor	4,786	14,346,818	519	1,319,075	4,013	14,803,971	9,318	30,469,864
	Sail	197	38,771	35	13,408	108	113,415	280	165,594
Wood and composite	Steam, motor and sail	11	1,638	7	3,586	23	20,575	41	25,799
	Total	4,984	14,387,227	561	1,336,069	4,144	14,937,961	9,639	30,661,257

NOTE.—Sailing vessels fitted with auxiliary power are included in the figures shown for steamers and motorships.

These figures are considerably below those for the preceding year, which were the highest reached since 1920.

It may be noted that of this projected tonnage 69.3 per cent. (1,007,340 tons) is intended to be built in Great Britain and Ireland, and 30.7 per cent. (446,710 tons) in other countries.

The appended table gives particulars of the number of vessels and tonnage, for which plans have been passed by the Committee, during the last nine years. The figures for 1914 are also given for reference:

Year Ended.	No. of Vessels.	Tons Gross.
June 1914	749	1,650,000
„ 1920	1,299	4,422,640
„ 1921	433	1,651,650
„ 1922	138	230,920
„ 1923	424	1,065,850
„ 1924	489	1,308,845
„ 1925	413	1,229,703
„ 1926	361	1,089,360
„ 1927	490	1,831,920
„ 1928	476	1,454,050

The countries in which the great majority of the new vessels, classed by Lloyd's Register during the year, have been built are shown in the following statement:—

Country.	No. of Vessels.	Tons Gross.
Great Britain and Ireland	418	1,348,004
Italy	21	153,413
Holland	24	73,788
Denmark	12	66,497
United States	22	63,877
Germany	40	53,819
France	9	41,770
Japan	7	31,885
Sweden	7	16,630
Spain	3	14,281
Russia	5	12,176

The countries for which most of the vessels were built are indicated below:—

Country.	No. of Vessels.	Tons Gross.
Great Britain and Ireland	323	1,134,833
Italy	10	121,216
Norway	18	99,583
British Dominions	49	95,065
United States	49	82,299
Holland	21	70,682
Brazil	9	39,569
Denmark	6	34,681

Moreover, at the end of the period under review, there were under construction throughout the world, to the Society's classification, 382 vessels, of 1,779,353 tons.

The aggregate of shipping holding, or intended to hold, the classification of Lloyd's Register amounts, therefore, to 10,021 vessels, of nearly 32½ million tons gross.

Of the 1,779,353 tons referred to as being under construction at the end of June to the Society's classification, 1,047,270 tons were being built in Great Britain and Ireland, and it is satisfactory to report that the last mentioned figure constituted over 87 per cent. of the total tonnage under construction at home.

During the year, the following vessels, each exceeding 10,000 tons, have received the Society's classification:—

Vessel's Name.	Tons.	Owners.
Augustus, m.s.	32,650	Navigazione Generale Italiana.
Conte Grande, s.s. (Turb.)	25,661	Lloyd Sabaudo Soc. Anon. per Azioni.
Saturnia, m.s.	23,940	"Cosulich" Soc. Triestina di Nav.
Duchess of Bedford, s.s. (Turb.)	20,123	Canadian Pacific Railway Co.
Duchess of Atholl, s.s. (Turb.)	20,119	Do. do.
Orford, s.s. (Turb.)	19,941	Orient Steam Navigation Co., Ltd.
Bermuda, m.s.	19,086	Bermuda & West Indies S. S. Co., Ltd.
Malolo, s.s. (Turb.)	17,232	Matson Navigation Co.
C. O. Stillman, m.s.	16,436	International Petroleum Co., Ltd.
Virgilio, m.s.	11,718	Navigazione Generale Italiana.
Orazio, m.s.	11,669	Do. do.
Victolite, m.s.	11,410	Imperial Oil, Ltd.
Vancolite, m.s.	11,404	Do.
Cheshire, m.s.	10,560	Bibby Steam Ship Co., Ltd.
Albertville, s.s.	10,388	Cie. Belge Maritime du Congo.
Gulfbird, m.s.	10,208	Gulf Refining Co., Inc.
Gretafield, s.s.	10,191	Northern Petroleum Tank S.S. Co., Ltd.
Harry Coulby, s.s.	10,180	Interlake Steamship Co.
Beaverford, s.s. (Turb.)	10,042	Canadian Pacific Railway Co.
Beaverhill s.s. (Turb.)	10,041	Do. do.

(s.s. = Steamship; m.s. = Motorship.)

The current editions of the British and American Yacht Registers record, among others, 505 yachts holding the classification of Lloyd's Register. Of this number, 205 are steel and iron vessels, 175 are of the International Rating Classes, while the remainder are wood and composite cruising yachts.

An interesting feature, in the design of vessels dealt with during the period under review, is the increase in the number of vessels built upon the Isherwood system of longitudinal framing. Since the end of June, 1927, 74 vessels, of 456,187 tons, have been constructed under the Society's superintendence.

It may be mentioned that all these vessels, with the exception of one of 2,694 tons, are intended for the carriage of oil in bulk.

Included in the above are 17 vessels, of 126,688 tons, built upon the "Bracketless System," a modification of the Isherwood longitudinal system of construction.

In addition, 25 vessels, of 131,476 tons, have been constructed upon the combined longitudinal and transverse system, and, of these vessels, 19 of 85,138 tons are also intended for carrying oil in bulk.

The total number of ships, of all types of construction, intended for carrying oil in bulk—excluding those of less than 1,000 tons—built under the Society's inspection during the last twelve months, amounted to 102 of 587,491 tons gross. This tonnage considerably exceeds the corresponding figures for the preceding year, and actually forms more than 31 per cent. of the total tonnage classed during the period.

In this connection, it is worthy of note that, included in the above figures are those pertaining to the motorship "C. O. Stillman," 16,436 tons gross, which is the largest tanker now afloat.

The steadily increasing demand for oil-carrying vessels is reflected in the following table, which shows the tonnage of all such vessels recorded in Lloyd's Register Book for the years mentioned:—

Register Book.	Oil Tankers. (Steamers & Motorships.) Gross Tons.
July, 1914	1,478,988
* * * * *	
July, 1919	2,929,113
July, 1920	3,354,314
July, 1921	4,418,688
July, 1922	5,062,699
July, 1923	5,203,601
July, 1924	5,243,238
July, 1925	5,384,290
July, 1926	5,664,786
July, 1927	5,915,677
July, 1928	6,620,028

Among other types of vessels, classed by the Society since June, 1927, may be mentioned five vessels, aggregating 31,261 tons gross, for the American Lakes Service, one train ferry, 77 yachts, 35 tugs, 23 trawlers and fishing vessels, and numerous river and harbour craft.

Reference may also be made to the fact that a floating dock, for use at Barranquilla, Colombia, received the Society's classification, viz.:—"+A1 Floating Dock."

Steam turbines were installed in 21 new vessels, of 209,018 tons gross, and in this figure is included one vessel (Steel Sc. "Carl D. Bradley," 8,806 tons) in which the turbo-electric drive is employed. With the exception of this case, all the turbines are associated with reduction gearing, in 17 of the vessels the single reduction type being employed, and in the remainder the double reduction type.

Vessels to the number of 91, of 431,391 tons—or 40.6 per cent. of the total tonnage of new steamers classed during the year—were fitted for burning oil fuel.

The following table, which includes all such vessels recorded in Lloyd's Register Book, shows the increase which has taken place in the gross tonnage of vessels either originally fitted to burn oil fuel, or subsequently converted for that purpose:—

Register Book.	Steamers fitted for Burning Oil Fuel.
July, 1914	1,310,209
* * * * *	
July, 1919	5,336,678
July, 1920	9,359,334
July, 1921	12,796,635
July, 1922	14,464,162
July, 1923	15,792,418
July, 1924	17,154,072
July, 1925	17,804,122
July, 1926	18,243,539
July, 1927	18,481,759
July, 1928	19,053,014

These figures include vessels which are fitted with installations for burning oil in the furnaces of their boilers, but it does not necessarily follow that all such vessels are actually using oil. It will be understood that a number of such installations can readily be replaced by coal-burning fittings when occasion demands the use of coal in preference to oil.

A development of exceptional interest in marine propulsion during the year under review, has been the use of pulverised coal as fuel for firing marine boilers.

The Committee of Lloyd's Register have followed with close attention the experiments which have been in progress, and, plans have been approved for the fitting of an installation which is capable of effecting the pulverisation of coal on board ship, and its subsequent delivery in a finely powdered condition into the boiler furnaces.

An outstanding feature in the shipbuilding output for the year has been the increased use of the internal combustion engine as a means of marine propulsion. New vessels fitted with this type of engine, to which classes have been assigned by the Committee during the last twelve months, amounted to 160, of 812,437 tons gross, of which 150 of 811,983 tons have engines using heavy oil. It is worthy of mention that of the total number of vessels fitted with internal combustion engines no less than 100, of 445,235 tons, have been built in Great Britain and Ireland.

Particulars of the ownership of these vessels are appended:—

Great Britain and Ireland	81 vessels of	377,913 tons.
British Dominions	8 „	49,931 „
Other Countries	71 „	384,593 „

At the close of the period there were 685 motorships, of 3,430,933 tons gross, recorded in Lloyd's Register Book, either actually holding the Society's classification or being completed under the special survey of the Society's Surveyors.

In the course of the year under review, the Committee have assigned classes to the following motorships, each of which is over 9,000 tons gross, viz.:—

Vessel's Name.	Gross Tons.
Augustus, steel quad. screw	32,650
Saturnia, steel twin screw	23,940
Bermuda, steel quad. screw	19,086
C. O. Stillman, steel twin screw	16,436
Virgilio, steel twin screw	11,718
Orazio, steel twin screw	11,669
Victolite, steel twin screw	11,410
Vancolite, steel twin screw	11,404
Cheshire, steel twin screw	10,560
Gulfbird, steel screw	10,208
El Argentino, steel twin screw	9,501
Dunster Grange, steel twin screw	9,494
Daghild, steel twin screw	9,272
Sir Osborn Holmden, steel twin screw	9,153
Christian, steel twin screw	9,119
Athelmonarch, steel twin screw	9,031

Mention was made in last year's Report of the continued demand for double-acting Diesel engines. There are now being constructed, under the superintendence of the Society's Surveyors, 17 sets of this type, of approximately 180,000 indicated horse power.

The continued development in the use of internal combustion engines, as recorded in successive editions of Lloyd's Register Book, is clearly illustrated by the following statistics, which include all motorships of 100 tons and over:—

Register Book.	Motorships (including Auxiliary Vessels).	
July, 1914	297	234,287
* * * * *		
July, 1919	912	752,606
July, 1920	1,178	955,810
July, 1921	1,473	1,248,800
July, 1922	1,620	1,542,160
July, 1923	1,795	1,666,385
July, 1924	1,950	1,975,798
July, 1925	2,145	2,714,073
July, 1926	2,343	3,493,284
July, 1927	2,552	4,270,824
July, 1928	2,933	5,432,302

It is of interest to note that, of the 2,933 motor vessels mentioned in the above table for the current year, 338 are of 6,000 tons and upwards. Of these, 204 have tonnages ranging from 6,000 to 7,999 tons; 95 are from 8,000 to 9,999 tons; 25 are from 10,000 to 14,999 tons; and 14 are of 15,000 tons and upwards.

Attention may be drawn to the fact that the tonnage of vessels either employing oil as fuel for motors, or fitted with oil-fuel-burning installations, forms no less than 37.6 per cent. of the total tonnage of all existing vessels of 100 tons and upwards as recorded in Lloyd's Register Book.

The details are as follows:—

	Tons Gross.
Total steam and motor tonnage (including auxiliary vessels)	65,159,413
Types of Engines—	
(i) Steam Reciprocating	50,045,048
(ii) Steam Turbines	9,682,063
(iii) Motors	5,432,302
Fuel—	
(i) Coal only	40,674,097 (62.4 per cent.)
(ii) Oil (including steamers capable of burning either coal or oil)	24,485,316 (37.6 per cent.)

The combination of a low pressure steam turbine connected to the main shafting of steam reciprocating engines through reduction gearing and hydraulic clutch, thus permitting the independent use of the reciprocating engines during manœuvring, provides an interesting development in the progress of marine engineering.

During the current year, the Committee have approved proposals for the construction of new machinery on this principle, and also for the conversion of existing steam reciprocating engines in a large number of vessels.

The trials of vessels in commission thus fitted have proved entirely satisfactory, showing in each case increased efficiency and greater power than would have obtained had reciprocating engines only been in use.

Port of Southampton Topics.

As was stated in these notes a month or so ago, there is every reason to believe that 1928 will prove a record year for the Port of Southampton. The statistics published by the Southern Railway Company for the first nine months of the year lend colour to these statements. They reveal some striking increases in trade. As compared with the first nine months of 1927, the number of vessels inward has increased by 84, and outward the increase is 79. The gross tonnage also shows a remarkable advance, for taking into consideration both the outward and inward totals, the increase is nearly 2,000,000 tons, the respective increases being: 750,486 tons and 1,225,567 tons. The cargo handled also shows a jump in the right direction. The inland total is 23,452 tons more than that for the first nine months of last year and the outward total 33,407 tons more. The probability of Southampton strengthening her position as premier passenger port of the United Kingdom is indicated by an increase of 18,706 passengers inward and 11,048 outward. The figures for the month of September, which are now available, record an all-round increase. The increase in the number of vessels inward and outward is just over 100—55 inward and 46 outward—the respective totals being 378, compared with 323, and 369, compared with 323. The tonnage increases were also pronounced. The gross tonnage inward rose from 1,533,239 to 1,642,840, an advance of 109,601, while the outward figure increased from 1,508,126 to 1,813,339, an increase of 305,213. The amount of cargo rose by 15,063 tons inward and by 2,173 outward. The total of inward cargo this September was 61,829 against 46,766 for the same month last year, and the outward, 52,909 against 50,736. Passengers inward increased from 29,338 to 33,859, and outward from 33,710 to 37,000.

DREDGING AND DUES.

One of the difficulties which are constantly arising at Southampton is that of catering for an ever-increasing yachting interest without, at the same time, impeding the work necessary in connection with dock extension. The Southern Railway Company have had to point out to the Harbour Board that a portion of the river channel which the Board undertook to clear of yacht moorings by September, 1927, is still being used by yachts, and is likely to prevent dredging for the dock extension scheme at that spot being carried out effectively. The matter has been referred to a special sub-Committee. From the Board's point of view, as a matter of fact, providing accommodation for yachts is not a very paying proposition, as most of the yachts have their own moorings and pay nothing to the Board for them. Now, owing to the new docks scheme it is necessary to find new accommodation for yachts, and it is feared that this cannot be done except at big expense. There is another side of the question, in view of the repeated requests which are received from the shipping companies for a reduction of dues. Is it fair, ask the companies, that the dues they pay should be devoted to yachting interests, which, are, at times, in conflict with their own? No opportunity of raising this question of reducing dues is lost by the shipping company representatives on the Board, and it has been decided to consider the possibility of making a reduction after the Board's accounts for the year are presented next April.

DREDGING AT SOUTHAMPTON.

In connection with the very large dredging contract which the James Dredging Towage and Transport Company, Limited, are carrying out for the Southern Railway's New Dock Works at Southampton, large quantities of soft overburdened mud have already been removed and deposited at sea, over 260-ft. run of the main retaining bank has been completed and faced up with fascines, together with about 600-ft. run of foundation already made in connection with this section of the work and the banks from the foundation are made to their required height and breadth by a special type of bank making machine called "Bankwell." It will be remembered that the total length of this huge main retaining bank will be over 4000-ft. long. Five Dredgers are presently engaged upon the work together with a large fleet of attendant craft all working continuously except week-ends, and a little later on, when there is more room for them to work, additional large new dredging plant of the most modern kind will be engaged upon the dredging operations in order to push the work along with all possible speed.

CRANAGE CHARGES—SOUTHAMPTON DOCKS.

It has been decided to increase the present reduction of 10 per cent. on the standard tariff operating in connection with the above to 20 per cent., and in addition to insert the following proviso:—

> "That where Cranes are hired at per hour or per day the same rate shall be maintained throughout the hiring, irrespective of the type of traffic handled."

These arrangements will operate in connection with work performed as and from 1st October, 1928, but will not apply to the special tariff relating to the 150-ton Floating Crane.

NEW DEPTH-SOUNDING DEVICE.

The old-fashioned method of taking ocean soundings by means of the hand lead is likely to be superseded by the "Fathometer," a device which has been fitted to the United States liner "Leviathan," more or less as an experiment. This ingenious little machine is worked through the medium of sound waves, and though it had been worked successfully on small vessels, it was not known until the "Leviathan" completed her voyage whether it would be equally successful when used on the world's fastest vessels. The reason for any doubt being entertained on this score was the fact that when a vessel is travelling at great speed a film of tiny bubbles is formed on the under-water plates of the hull. The "Leviathan's" experiment has proved, however, that this does not prevent the penetration of sound to the extent anticipated. The navigator of the "Leviathan" told me that the Fathometer had worked very accurately and that its readings were always within a few inches of the actual depth of the water under the ship. The Fathometer enabled him to secure 23 soundings a minute, and this represented a tremendous saving over the old method, which occupied from five to fifteen minutes for each sounding. On vessels going a moderate speed it would be possible to take as many as 240 soundings a minute. A hammer in the keel of the ship is made to strike a diaphragm which emits a short train of submarine sound waves. These waves rush to the ocean bed and on travelling back to the surface they actuate a hydrophone which causes a streak of light in the Fathometer indicator situated in the vessel's chart room. This light flashes by the side of figures on a circular dial representing fathoms. Whatever depth a particular sounding reveals is recorded by the light appearing by that figure on the dial.

CARGO FACILITIES APPRECIATED.

Gratification is felt among port authorities that the New Zealand meat season, which has now closed, has been marked by increasing success in securing consignments for Southampton. A very few years ago meat cargoes from New Zealand to Southampton were few and far between, but this season the progress has been remarkable, and the number of vessels which have discharged New Zealand cargoes at the port is said to constitute a record. There is no more difficult task than attracting exporters and importers from their old loves in the matter of ports and Southampton, being regarded primarily as a passenger port, its facilities for cargo handling were overlooked for some time. One of the features of these facilities has been the excellence of the accommodation provided at the cold stores in the docks, and this has very favourably impressed the New Zealand Meat Producers Board. The cargoes dealt with this year have varied from 10,000 to 30,000 carcases. The fruit traffic from New Zealand has also shown healthy growth and a large proportion of the million or so cases shipped came to Southampton. It may be mentioned here that last year the Cold Storage Company in the docks embarked on a bold venture in taking possession of apples from "down under," and keeping them until the big autumn show in Manchester. It was the first time that fresh fruit from New Zealand had ever been displayed at the show, and such was the excellence of its condition that even experts were hard to convince that it was indeed New Zealand fruit. The exporters were delighted with the success achieved and this year the experiment has been repeated on an even larger scale.

COLONEL WILLAN RETIRES.

Colonel Frank Willan, J.P., who has been Deputy-Chairman of the Southampton Harbour Board since its reconstruction over 14 years ago, has retired. He served on the Board as the representative of the Hampshire County Council, and he has retired on account of age. He is in his 83rd year. At the last meeting of the Board the Chairman (Mr. Harry Parsons) and other members spoke warmly of the work Colonel Willan had done, and of the sound judgment he had always shown. The appointment of a successor to Colonel Willan was left over until the next meeting of the Board.

North-East Coast Notes.

An important decision was made by the Tyne Improvement Commission at their last meeting, for it was determined to seek sanction for the increase of the Commissioners' borrowing powers by £2,200,000. Sir William Noble, who moved the adoption of the recommendation of the Parliamentary Committee to that effect, explained that the Commissioners had almost exhausted their borrowing powers, and in view of the many schemes in prospect it was necessary that they should have more powers. He hoped the sum named would be spent in the course of a few years in such a way as would increase the facilities offered in the river. The recommendation approved included the acquisition of powers to construct works, to acquire lands, and to lease or purchase docks and wharves. Sir William referred to the recent visits of various public bodies to the Tyne, and said he hoped the visitors had had their eyes opened to the great possibilities offered by the river to firms desirous of establishing works.

The same meeting approved an application from Pelaw Main Collieries, Limited, to construct a new coal loading jetty at Pelaw Main. The jetty is to be about 147½-ft. long, and 23-ft. wide and is to be supported by 16 ferro-concrete cylinders. A conveyor or shipping belt is to be constructed so that it can be drawn back when not in use. Colonel Simpson remarked that the conveyor belt was of interest, as it would tend to increase the dispatch of vessels loading in the river.

COAL SHIPPING FACILITIES.

The facilities for coal shipping on the Tyne are generally adequate as has been proved on several occasions, the real trouble recently being shortage of tonnage. An instance of quick bunkering was recorded at the end of September when the s.s. "Sinnington Court," of the Court Line, of London, took aboard 2,162 tons of bunkers between 6.30 a.m. and 7.30 p.m.—actually in 11 hours 55 minutes working time.

The complaints as to congestion at Dunston Coal Staiths, and the consequent delay to vessels was discussed before the Joint Railway Committee for Newcastle area. The general contention of coal owners, ship owners and coal exporters was that prompt despatch was essential having regard to the keenness of competition, and it was suggested that when shipping became congested at Dunston the London and North-Eastern Railway Company might divert coal to Tyne Dock—if berths were available—at the same charges as ruled at Dunston, which is, of course, also the property of the London and North-Eastern Railway Company. This suggestion was still under consideration by the Railway Company at the time of writing.

Reference to the development of the Shell-Mex oil depot at Jarrow was made at a meeting of Jarrow Town Council when a licence was granted to the Company to store over 1½ million gallons of petroleum. Alderman Rose said the store of petroleum at Jarrow was the largest North of Hull and Leeds. They all welcomed the new industry, and were pleased that the company had found its site so suitable for development. He mentioned that the Committee had been struck with the precautions taken to store the spirit safely.

VISITORS FROM VANCOUVER.

Mr. K. J. Burn, Port Superintendent of the Harbour Commissioners of Vancouver, and Mr. William A. McAdam, Secretary of the Office of the Agent-General for British Columbia, visited Newcastle on September 28th. Speaking at a meeting of the General Purposes Committee of Newcastle and Gateshead Chamber of Commerce, Mr. Burns explained that the Commissioners felt that the best thing to do was to send representatives to England to meet face to face those with whom they did business, the desire of the Commissioners being to develop trade between British Columbia and this country in every possible way.

The Tyne-Tees Steam Shipping Co., Ltd., have taken over the weekly service between Antwerp and Sunderland, which formerly was run by Messrs. W. H. Muller & Co., Antwerp, under the agency of Messrs. Common Bros., Sunderland. The Tyne-Tees Company's steamer will leave Antwerp on Tuesday evenings, arriving for discharge in Sunderland on Thursdays, and sailing again for Antwerp on Saturdays. Messrs. J. P. Best & Co. are the Antwerp loading agents and brokers. The change was made as from October 1st.

The King of Norway has distinguished two Tynesiders by conferring upon them the highest honour in his gift—namely by creating them Knights of the Royal Order of St. Olav (First Class). The recipients are Sir William J. Noble, Bart., chairman of the Tyne Commission and a prominent shipowner, and the other Mr. Thomas Tindle-Anderson, of South Shields, who has rendered signal service in the development of trade and commerce between this country and Norway.

LOSS TO SHIPBUILDING.

A gentleman prominently associated with North Country ship building and and ship repairing has passed away in the person of Mr. William Henry Dugdale, managing director of Messrs. S. P. Austin & Son, Limited, ship builders and ship repairers, Sunderland. He was a native of Monmouth, and after a long connection with Messrs. R. & J. Evans, of Liverpool, he joined Messrs. Workman Clark & Company, of Belfast. He later went to Messrs. Harland & Wolff's, and thence to the Palmer Company's yard at Jarrow, which he left to take up the managing directorship of Messrs. Austins, nearly 30 years ago. Mr. Dugdale was a member of the Institution of Civil Engineers, a member of the Institution of Naval Architects, serving for some time on the Council of the latter body, Past-President of the North-East Coast Institution of Engineers and Shipbuilders.

The shipbuilding industry has also suffered loss by the death of Mr. William Wilson, manager of the Central Shipyard of Messrs. W. Gray & Company, Limited, West Hartlepool. He was formerly yard manager for the Northumberland Shipbuilding Company at Howdon-on-Tyne.

There has been marked variety in the steamships launched in the North during the past month. To mention only a few one might name the "Seatrain," a vessel designed to carry loaded freight cars between Havana and New Orleans, built by Messrs. Swan, Hunter & Wigham Richardson & Sons, Limited, for Overseas Railways Incorporated, of New York; and the motor ship "Port Alma," built by the same builders, for the Commonwealth & Dominion Line, Limited, which can carry 140,000 cases of fruit or the same number of lambs. Palmer's Shipbuilding Company launched the "Creole Jefe," a twin-screw oil tank of 4,000 tons, specially constructed for shallow waters, and Messrs. Hawthorn Leslie launched H.M.S. "Sandwich," of the sloop and mine-sweeping class. These are but a quartette from a long list of vessels that have been launched.

NEW WORKS AND FACILITIES AT CARDIFF DOCKS.

The Great Western Railway Company have again given an instance of their progressive policy by the provision of three new 3-ton hydraulic cranes at the Roath Dock, Cardiff, which have just been brought into commission.

The provision of these cranes will further improve the facilities for dealing with all classes of general cargo at the Roath Dock. The photograph reproduced shows the new cranes discharging a cargo of pit props.

Since the Great Western Company became the proprietors of the South Wales Docks following upon the amalgamation under the Railways Act, they have pursued a policy of continuous improvement of the facilities, and have spent large sums of money in reconstructing existing appliances and providing new ones, in order to keep the docks machinery and equipment generally thoroughly up-to-date.

Glasgow Telegraphic Address—"Livadia Glasgow." Telephone—3743-4-5 Douglas.
BROWNLIE & MURRAY, LTD. STRUCTURAL ENGINEERS. POSSILPARK, GLASGOW. London—59/60, Gracechurch St., E.C.3.
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PNEUMATIC PLANTS
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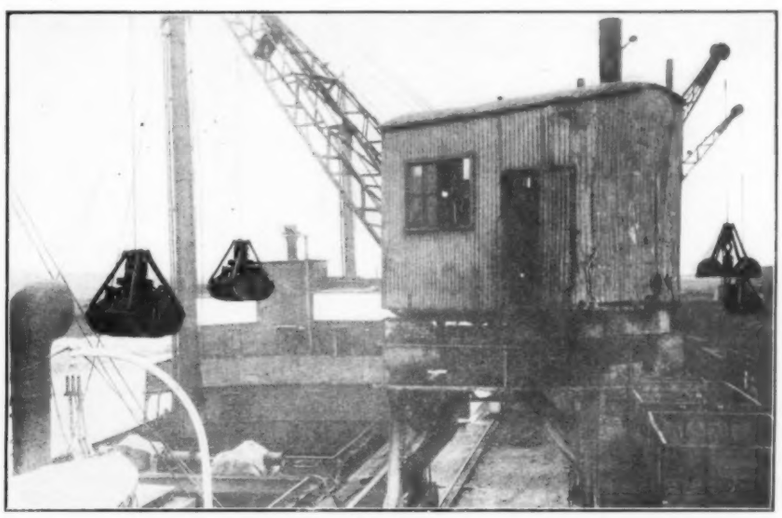

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Irish Harbour Matters.

IRISH FREE STATE PORTS TRIBUNAL.

Giving evidence before the Irish Free State Ports and Harbours Tribunal at the office of the Department of Agriculture, Dublin, Sir John Purser Griffith said that a change was desirable in the control and management of Free State ports and harbours. The State should otherwise exercise some control over the ports, harbours and marine works of the country. Supreme control, should, in his opinion, rest with the Minister of the Executive Council. He also suggested Advisory Boards under the Harbour and Marine Works Dept.

Whatever authority the Tribunal recommended for the ports and harbours, should be so constituted as to be capable of controlling all harbours, piers, marine works and aids to navigation round the coast. It should control the maintenance of all harbours and piers not classified as statutory harbours upon which public money has been spent, the provision of the necessary dredging plant; the provision of up-to-date charts for the Irish harbours and coast; the decision as to the provision of port equipment; the construction and maintenance of coast erosion defence works, and the control of lights, beacons, buoys and aids to navigation.

On the question of coast erosion defence works, Sir John referred especially to Wicklow, where he had advised the Government. Mr. Randall had carried out the work, but maintenance work would have saved thousands of pounds.

Dredging was important, particularly in the small harbours. This could be dealt with by a National dredging plant, as provided in the United States, for letting out to harbour authorities. He presumed that this plant in the United States was maintained by the State. In Dublin they had a splendid dredging plant, but it would be useless for small harbours.

All harbour boards in his opinion should be nominated bodies subject to the Ministry. Popularly elected boards did not, as a rule, possess the technical knowledge necessary.

GALWAY FOR ATLANTIC LINERS.

In order to provide a terminal for Transatlantic high-speed services, Sir John suggested the construction of a new port about six miles from Galway City and two miles west of Barna Quay. The Arran Islands provide a natural breakwater, in addition to which Sir John recommended the construction of an artificial breakwater, some 7,000-ft. in length which would give shelter from south-westerly and southerly winds, and would enclose one of the finest natural harbours in the world. Ships drawing as much as 40-ft. of water could manœuvre comfortably in this harbour and the largest Atlantic liners would be berthed in complete shelter. The total water acreage of the harbour would be 147 acres. Only 5¾ miles of railway would be required to link up the proposed port with the Galway-Dublin Railway.

Having referred to the existence of obsolete Irish charts, published by the Admiralty, Sir John said he would like to see the Irish lights controlled by one authority, if it were possible to come to terms with the Northern Government.

Mr. Wm. Hewat has been appointed as representative of the Dublin Port and Docks Board on the Council of the Mansion House Association on Railway and Canal Traffic, in place of the late Mr. John Hollwey.

FUNCTIONS OF THE DEPT. OF FISHERIES.

Mr. L. G. Moriority, Secretary of the Dept. of Fisheries, stated that the function of his department was mainly advisory, but it made grants for small harbour works and for dredging, and suggested plans and negotiated the financing of larger works. Generally speaking, he said there was ample provision for fishing on the present scale. At present there was no steam trawling done at any port outside Dublin. Deep-sea fishing could be carried on from the existing ports at Dun Laoghaire, Cork, Fenit and Killybegs, without many structural improvements. Galway would require deepening of the channel leading to the docks to permit vessels having the draught of a steam trawler to berth at all stages of the tide. Depth of water, rapid transit of the catch to market, proximity to the market, safe anchorage, modern facilities for rapid bunkering together with cheap coal and ice were important factors at a deep sea fishing port. Dublin and Cork possessed these factors. Killybegs and Fenit Harbours had rail facilities and depth of water, but no ice factory. Galway had not depth of water, but all the other facilities.

Considerable dredging was needed in the harbours on the South Coast. Of the 38 harbours in the Free State at which fishing vessels drawing 8 to 9-ft. could operate, 14 served vessels from other ports; at the other 24, fishing was considered by local vessels only.

At Buncrana an extension of the pier and quays and deepening of the berthage were necessary. The work was estimated to cost between £25,000 and £30,000. At Rathmullen, an openwork extension of the pier to deep water was necessary. The estimated cost was £10,000. At Reenard Point, plans were under consideration to meet the needs of the port and the estimated cost was £20,000.

As to the suggested grouping of harbours under centres like Dublin, Cork and Galway, Mr. Moriority said he did not see any advantage in central organisation.

ANOTHER PLEA FOR CENTRAL MANAGEMENT.

Sir Philip Hanson, Chairman of the Board of Works, said it would not require a large or expensive staff for the Government to manage from Dublin, 20 or 30 of the smaller harbours. A considerable saving could be effected in the maintenance of small harbours in this way. The cost of the proper engineering staff and equipment and the provision of funds to meet any emergency would usually be beyond the resources of any single one of a number of small harbours. Such harbours would be more cheaply and efficiently managed by a central common staff with adequate training and equipment.

The Waterford Harbour Commissioners have invited tenders for the supply and erection on a prepared site of an optional hand and electrically operated hoisting and slewing 20-ton travelling wharf crane.

Book Review.

EXCAVATING MACHINERY, by W. Barnes, M.I.Mech.E. 241 pp., 165 illustrations. Published by Ernest Benn, Ltd., at £2 2s. 0d. net.

This book is composed of eight chapters and extensively describes excavating machinery as represented by power shovels, drag lines and grabbing cranes.

In the last 30 years there have been vast developments in the maximum weight of these machines; towards the end of the 19th century it was a mere matter of 50 tons; now to-day the maximum weight has risen to 1,200 tons, which would have seemed in those days an alarming and impossible figure. Also power to-day is obtained from heavy oil engines, petrol engines, petrol-paraffin engines, electric motors or a combination of oil or petrol engines and electric motors instead of steam, which was the only means of motive power 30 years ago.

Another and perhaps most important innovation was the introduction of caterpillar wheels, which enable the machines to travel under their own power without the use of a railroad.

In the first chapter, which is devoted to historical development, the author conducts us through the ages, showing the tremendous advancement made in excavating machinery, from the year 1560—the earliest date on record—when an endless chain dredger was used for dredging a canal between the Ruppel and the Scheldt. The first grab or clam shell on record is mentioned in a book written by an Austrian Bishop named Verantius, and dated 1591.

Steam shovels were first used in 1834, when the "Otis," a shovel designed by William S. Otis, was used on the Baltimore and Ohio Railroad.

The first crane navvy was made in 1884 by Whitaker & Sons, of Leeds. Then followed the Jubilee Crane navvy, so named because it was introduced in the Jubilee year of Queen Victoria. This machine was first used on the Manchester Ship Canal.

The long jib full circle shovel was first built in 1900 and this same machine was still in use in 1927. It was used for stripping iron ore in Northamptonshire and Oxfordshire.

In 1904 the drag-line excavator was first used, but not with much success. Electrically-operated excavators were first built in 1899.

We now come to self-laying tracks, or caterpillars, and as is generally believed, this is a comparatively new idea, but the author gives us a rather rude awakening by stating that the earlier reference to self-laying tracks is found as far back as 1691, and a Patent No. 277, was granted to Kendrick Edisbury, and also in 1770, when a Patent was granted to Richard Lovell Edgeworth, whose specification, which is interesting, is as follows:—

> "My invention consists in making portable railways to the carriages so that several pieces of wood are connected to the carriage, which it moves in regular succession in such a manner that a sufficient length of railway is constantly at rest for the wheels to roll upon, and that when the wheels have approached the extremity of this part of the railway, their motion shall lay down a fresh length of rail in front, and the pieces of wood which are taken up in the rear are in succession laid in the front so as to furnish constantly a railway for the wheels to roll upon."

The author concludes this chapter with a description of internal combustion engine-driven machines, the first use of which was made in 1912.

Chapter 2 is devoted to types of excavating machinery, and Chapter 3 to constructional details.

The application of excavating machinery as regards public works contracting, irrigation and drainage, sand and gravel pits, opencast mines and quarries, the clay-working industry and the cement industry, is dealt with in Chapter 4.

Chapter 5 is devoted to hints for the proposed purchaser, and Chapter 6 hints for the user.

Auxiliary plant and its applications and miscellaneous useful information are respectively dealt with in Chapters 7 and 8.

The book is a very complete work on the subject of excavating machinery, and the author is to be congratulated on his presentation of this book. The data required for the chapter on historical development, especially, must have taken considerable time.